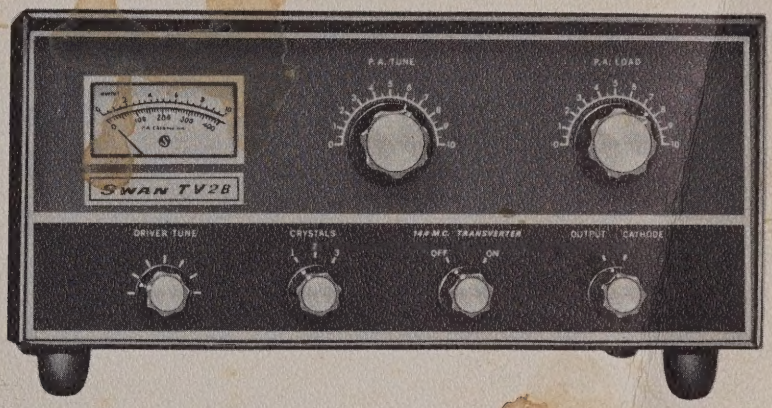
OPERATION AND MAINTENANCE

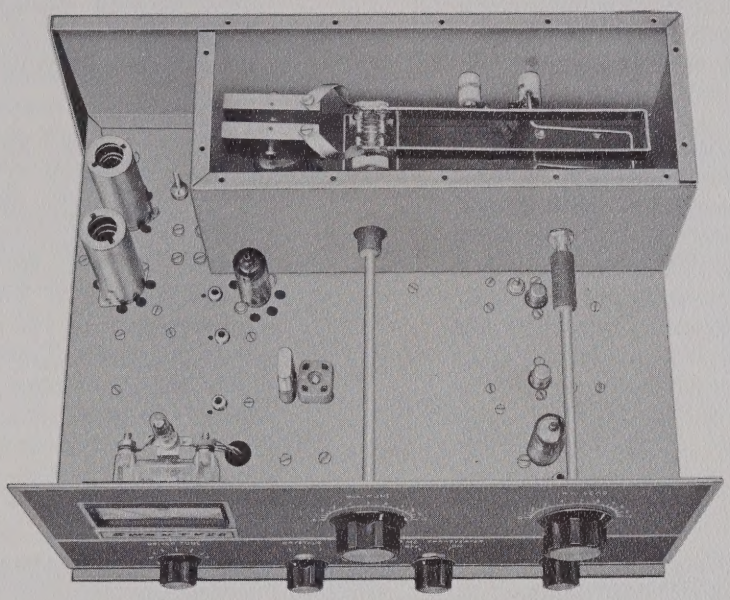


144-148 MC TRANSVERTER, SWAN MODEL TV-2B

SWAN
ELECTRONICS
Oceanside, California
A Subsidiary of Cubic Corporation

CONTENTS

144-148 MC RECEIVING AND TRANSMITTING CONVERTER SWAN MODEL TV-2B



1. GENERAL DISCUSSION

1.1 The Swan model TV-2B is a crystal controlled transmitting and receiving converter for the 2 meter band designed to operate with Swan Tranceivers, models 250, 250-C, 350, 350-C, 400, 500 and 500-C. The 20 meter band has been chosen as the standard intermediate frequency, (I.F.), since it will provide excellent stability and frequency readout. However, the TV-2B is also available with its I.F. range in the 15 meter, 10 meter, or 6 meter amateur bands. The various I.F. ranges may be ordered through Swan dealers, or when required, the TV-2 may be quite easily modified for a different I.F. range.

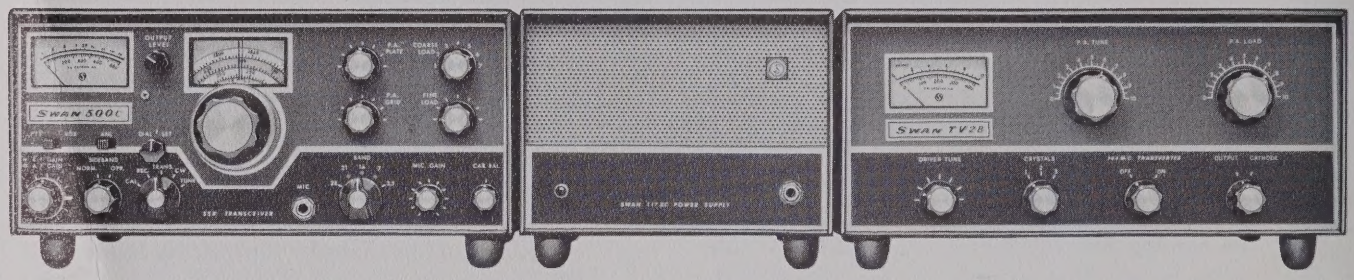
1.2 In the standard model TV-2B with 20 meter I.F., the 14 mc output from the Transceiver is heterodyned with a 130 mc crystal controlled signal to produce a 144 mc output from the TV-2B. As the Transceiver is tuned from 14 mc up to 14.35 mc, the Transverter output moves upward in frequency, always 130 mc plus the Transceiver frequency. In receiving mode, the incoming signal at 144 mc is heterodyned with the 130 mc crystal controlled signal, producing a difference frequency of 14 mc. The difference frequency, or I.F. signal, is received by the Transceiver the same way as any other 14 mc signal. As the Transceiver is tuned from 14 to 14.35 mc, it will be monitoring signals coming in from 144 to 144.35 mc. In other words, the TV-2B Transverter simply converts the 144 to 144.35 mc portion of the 2 meter band to cover the 14 to 14.35 mc range, and as far as the Transceiver is concerned, it tunes and operates just as it does when being operated on 20 meters. It is only necessary that the crystal frequency, 130 mc, be added to the Transceiver dial reading. If the Transceiver will tune higher than 14.35 mc, then the frequency range on 2 meters will go correspondingly higher. For instance, the model 500-C Transceiver tunes to 14.45 mc, so the 2 meter range when using 130 mc injection will go up to 144.45 mc.

1.3 A 3 position crystal selector switch on the TV-2B provides for selection of three conversion ranges. Thus, three segments of the 2 meter band may be covered. Normally, this will be three adjacent segments at the low end, for example: 144 to 144.45 mc, 144.45 to 144.9 mc, and 144.9 to 145.35 mc. These three ranges require crystal injection frequencies of 130, 130.45, and 130.9 mc, respectively.

1.4 **15 Meter I.F.**
If an I.F. range in the 15 meter amateur band is preferred, operation will be essentially the same as with 20 meter I.F., except that the crystal injection frequency will be 144 minus 21 mc instead of 144 minus 14. Tuning the Transceiver across the 15 meter band, from 21 to 21.45 mc, will tune an equivalent .45 mc segment of the 2 meter band. A crystal injection frequency of 123 mc will thus result in a range of 144 to 144.45 mc, etc.

1.5 **10 Meter I.F.**
If an I.F. range in the 10 meter amateur band is selected, a wider segment of the 2 meter band will be tuned with each crystal frequency. The 10 meter band tunes from 28 to 29.7 mc, or 1700 KC as compared to 450 KC on 15 meters and 350 KC on 20 meters. The Swan Transceivers tune the 10 meter band in one range. Thus, if the Transverter I.F. is on 10 meters, a crystal injection frequency of 116 mc will result in an operating range of 144 to 145.7 mc. (116 plus 28 mc, and 116 plus 29.7 mc). Thus, a larger portion of the 2 meter band can be covered by selecting a 10 meter I.F. range. In fact, by proper selection of the three crystal frequencies, the entire 2 meter band, from 144 to 148 mc may be covered. However, overall stability and frequency readout will not be quite as good as with a 20 meter I.F. Since most operating in the 2 meter band does not cover the entire 4 mc band width, but is concentrated in small segments, the 20 meter I.F. range is generally recommended, and has been designated as standard.

1.6 **6 Meter I.F.**
When the Swan 250 or 250-C Transceiver is used with the TV-2B Transverter, the I.F. range will be in the 6 meter band. The advantage in this case is that the entire 2 meter band will be covered with one crystal in the TV-2B. The crystal injection frequency will be 144 minus 50 mc, or 94 mc. In tuning the Transceiver from 50 to 54 mc, the operating frequency will tune from 144 to 148 mc. Since the vernier dial on the Transceiver covers .5 mc, (500 KC), frequency readout and stability will be good.



2.0 TECHNICAL SPECIFICATIONS:

(a) **Frequency Range, Output:** 144-148 MC
(b) **Frequency Range, Input:** 20 meter band standard. 15, 10, or 6 meter bands, optional.
(c) **Transmitter Power Rating:** 240 watts PEP input with single sideband voice modulation, 180 watts CW input, 75 watts AM input. Power output in TUNE mode: 80 to 100 + watts.
(d) **Transmitter Output Impedance:** 50 to 75 ohm coaxial cable, series tuned link coupling.
(e) **Transmitter Distortion Products:** Approx. 30 db below rated output.
(f) **Receiving Converter:** Nuvistor Cascode with Noise Figure less than 3 db.
(g) **Metering:** P.A. Cathode Current, 0-400 Ma. Relative Output, 0-10.
(h) **Panel Controls:** P.A. Tune, P.A. Load, Driver Tune, Crystal Selector, Meter Switch, 144 mc Transverter on-off.
(i) **Rear Panel Controls and Connectors:** P.A. Bias Adjust, Power Supply Connector, Relay Control Jack, I.F. Output Jack, Coax. Antenna Connector, Lo Frequency Antenna.
(j) **Tube Complement:** 6JK6 Injection Amp., 12BY7 Transmit Mixer, 5763 Driver, 5894B/8737 Power Amplifier, Two 6CW4 Nuvistors in Rec. R.F. Cascode, 6HA5 Rec. Mixer.
(k) **Transistors:** 2N706 Crystal Osc., 2N706 Freq. Multiplier.
(l) **Power Requirements,** (Normally supplied by Swan 117XC power supply, operating both the Swan Transceiver and the TV-2 Transverter): Filaments, 12.6 volts AC or DC, 2.04 amps.
Medium Voltage, 275 volts DC, 120 Ma.
High Voltage, 800 volts DC, 240 Ma.
Bias, 110 volts negative DC, 6.4 Ma.
Osc. Supply, 10 volts regulated negative DC, at 9 Ma.
Relay Supply, 12 volts DC at 125 Ma.
(m) **Dimensions:** 13 in. wide, 5½ in. high, 11 in. deep. Weight, 13 lbs.

3.0 CIRCUIT DESCRIPTION

3.1 **Receiving Mode.**
An incoming signal in the 144-148 mc range is first amplified by the 2 stage cascode circuit which uses 6CW4 Nuvistors, providing excellent sensitivity and low noise figure. The amplified signal is then heterodyned in a 6HA5 triode mixer with the crystal injection signal. The frequency difference or "I.F.", is selected by a resonant circuit, and then coupled into the Transceiver where it is received exactly like any other received signal in the I.F. range. The crystal injection signal is generated by a transistorized crystal oscillator which drives a frequency tripling stage. Thus, the crystals are actually oscillating at one-third the required injection frequency.

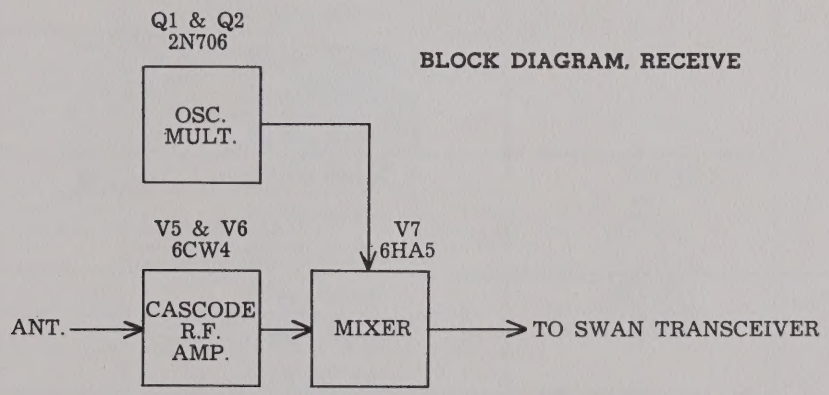
3.2 **Transmitting Mode**
Transmitting output from the Transceiver is coupled into the cathode circuit of the 12BY7 transmit mixer stage in the TV-2B. Here it is heterodyned with the crystal injection signal. The sum of the two frequencies falls in the 2 meter band, and is amplified first by the 5763 tuned driver stage, and then by the 5894-B Power Amplifier stage. Output is coupled into the 2 meter antenna system through a coaxial cable connector. The crystal injection signal is derived from the same crystal oscillator and frequency tripler circuit that is used in Receive Mode, with further amplification by a 6JK6 pentode amplifier stage providing the necessary injection voltage.

3.3 **Power Supply Requirements**
The same Swan model 117-XC power supply which provides operating voltages for the Swan Transceiver is used to power the TV-2B Transverter. The additional power requirements are adequately provided by the 117-XC:

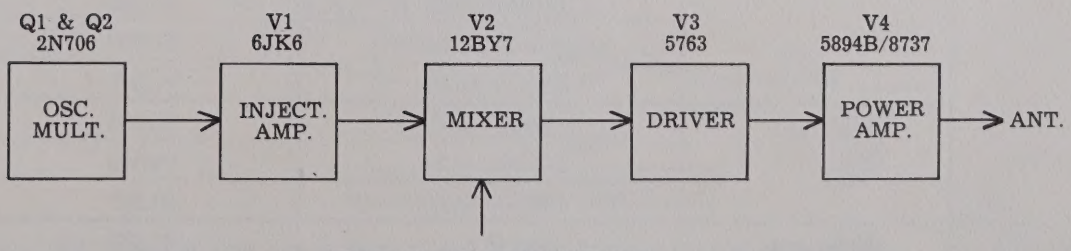
(a) 12.6 volts AC at 2.04 amps is required for filaments.
(b) 12 volts DC at 125 ma for the TR relay.
(c) 110 volts negative DC for Bias.
(d) 275 volts DC at 120 ma medium voltage.
(e) 800 volts DC at 240 ma high voltage.

Note: 10 volts regulated negative DC at 9 ma is required for the transistor oscillator and frequency tripler stage. This voltage is supplied by the Swan Transceiver, and is one of the interconnecting changes to be made in the Transceiver, and described under "Installation, Transceiver Modifications," on page 5.

BLOCK DIAGRAM, RECEIVE



BLOCK DIAGRAM TRANSMITTER



4.0 CRYSTAL FREQUENCY SELECTION

4.1 The formula for calculating the crystal frequency to be used in the TV-2B is:

$$Fx = \frac{\text{Signal Freq.} - \text{I.F.}}{3}$$

Where Fx is the crystal frequency, Signal Freq. is the desired operating frequency of the TV-2B, and I.F. is the operating frequency of the Transceiver.

When ordering crystals specify parallel resonant and pico farad load.

4.2 For example, for a signal frequency of 144 mc, and an I.F. of 14 mc, the crystal frequency will be 144 minus 14, or 130, divided by 3, which calculates to 43.333 mc. This will normally be the crystal in position 1 of the crystal selector switch. With this crystal the tuning range will extend from 144 to 144.45 mc as the Transceiver is tuned from 14 to 14.45 mc.

4.3 To calculate crystal number 2, subtract 14 from 144.45, and divide the difference by 3. The result is 43.483 mc, and with this crystal the tuning range will be from 144.45 to 144.9 mc as the Transceiver is tuned from 14 to 14.45 mc.

This same method of calculation may be used to place TV-2B operation in any desired portion of the 144-148 mc band.

4.4 The following chart lists some of the various arrangements which may be selected for Swan Transceivers.

Swan Transceiver	I.F. Tuning Range	TV-2B Range	Crystal Freq.
Swan 350-C and 500-C	14-14.45	144.00-144.45	43.333 mc
		144.45-144.90	43.483
		144.90-145.35	43.633
		145.35-145.80	43.783
		145.80-146.25	43.933
		146.25-146.70	44.083
	21-21.45	144.00-144.45	41.000
		144.45-144.90	41.150
		144.90-145.35	41.300
		145.35-145.80	41.450
		145.80-146.25	41.600
		146.25-146.70	41.750
	28-29.7	144.00-145.70	38.666
		145.00-146.70	39.000
		146.50-148.20	39.500
Swan 350 and 500	14-14.35	144.00-144.35	43.333
		144.35-144.70	43.450
		144.70-145.05	43.566
	13.85-14.35	144.00-144.50	43.383
		144.50-145.00	43.550
		145.00-145.50	43.716
		145.50-146.00	43.883
	21-21.50	144.00-144.50	41.000
		144.50-145.00	41.166
		145.00-145.50	41.333
		145.50-146.00	41.500
	28-29.7	144.00-145.70	38.666
		145.00-146.70	39.000
		146.50-148.20	39.500
Swan 250	50-54 mc	144-148	31.333 mc

6.0 INSTALLATION

6.1 Remove the protective packing from around the 5894B power amplifier tube. First remove the TV-2B cabinet, and then the P.A. top cover. Make certain the 5894B is plugged all the way down in its socket, and that the plate connectors are secured.

6.2 The following modifications must be made in your Swan Transceiver before connecting the TV-2B.

(a) Remove the bottom cover from the Transceiver, and locate the 12 pin power supply connector. If you have a 500-C it will be necessary to remove the brass cover plate from the TV filter box.

(b) Locate Pin 11 on the power supply connector. If there is a wire lead already connected to Pin 11, remove it. It will not be needed. Connect a wire lead from Pin 11 to the —10 volt terminal of the Zener diode, D1601. This is a stud type 10 watt diode mounted on the chassis near the accessory socket hole. Connect to the lug which comes from the main body of the diode. This is the —10 volt terminal, and will supply the regulated voltage to the crystal oscillator in the TV-2B.

(c) Connect a .01 mfd. ceramic disc bypass from each of the Auxiliary relay terminals to a ground lug. These are the three terminals located on the back of the Transceiver chassis just behind the P.A. tubes. The three .01 bypasses should have a 500 volt rating.

(d) Connect three .01 mfd. bypass capacitors from pins 4, 5, and 10 of the power supply connector to a ground lug. If you have the model 500-C, these bypasses may be connected outside the brass TV filter box. In this case, the .01 capacitors will connect from the feed thru capacitor to ground, and will thus be in shunt with the .001 mfd. feed thru.

(e) The voltage dropping resistors for the zener diode (D1601) should be changed so that both are 500 ohms, if FM is experienced on your SSB signal. The best way to check is to listen to the signal on CW while keying the transmitter, no chirping or frequency shift should take place.

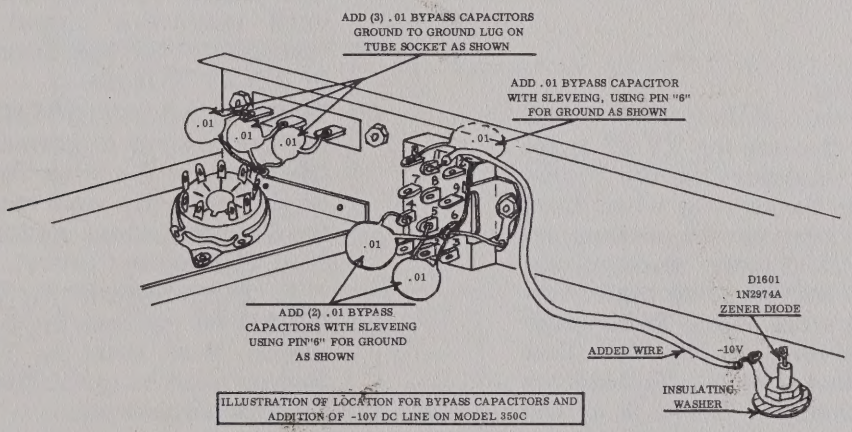


ILLUSTRATION OF LOCATION FOR BYPASS CAPACITORS AND ADDITION OF -10V DC LINE ON MODEL 350C

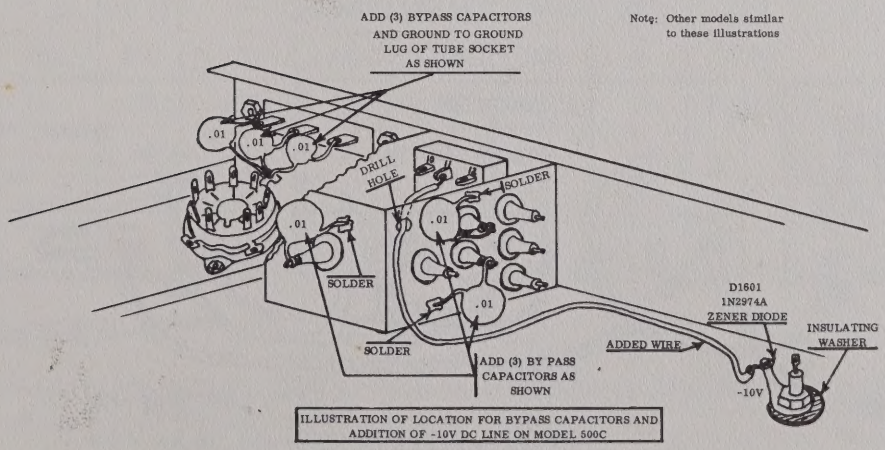


ILLUSTRATION OF LOCATION FOR BYPASS CAPACITORS AND ADDITION OF -10V DC LINE ON MODEL 500C

OTHER MODELS WILL BE APPROXIMATELY SIMILAR.

6.3 Make all connections between the TV-2B, Transceiver, and Power Supply as illustrated below. Make certain that the relay control leads are properly connected so the TV-2B relay closes when the Transceiver is switched to Transmit Mode. Otherwise, output from the Transceiver can damage the TV-2B receiver circuitry.

6.4 **Antenna**

Any of the common antenna systems designed for use in the 2 meter amateur band may be used with the Swan Transverter provided the input impedance of the transmission line is not outside the capability of the matching network. The transmission line should be of the coaxial cable type. An antenna system should show a standing wave ratio of less than 2:1 when using 50 or 75 ohm coaxial transmission line. If open-wire or balanced type transmission line is used with the antenna, a suitable antenna tuner is recommended between the Transverter and the feedline. Various types of antennas are available from your dealer, and for the antenna builder, many are described in the amateur handbooks, also available from your dealer. Remember that even the most powerful transmitter is useless without a proper and efficent antenna system.

7.0 OPERATION

7.1 **Transceiver Tuning**

Set the Transceiver to the proper band, corresponding to the one the TV-2B is set up for. Tune-up procedure on the Transceiver is generally the same as when operating it directly into an HF antenna on that band, except that meter readings will not be as high as normal, since plate voltage to the output stage of the Transceiver has been reduced to plus 275. Note that P.A. Bias adjustment for the Transceiver should not be changed. Leave it at the same setting as when operating normally at full voltage. During Transceiver tuning, you may disregard the TV-2B meter, but remember to **tune the Transceiver quickly, and not more than 10 seconds** at a time.

(a) For HF models 350, 350-C, 400, 500 and 500-C: Adjust P.A. Load controls until P.A. Plate dips to a cathode current reading of 150 ma. (Transceiver Meter)

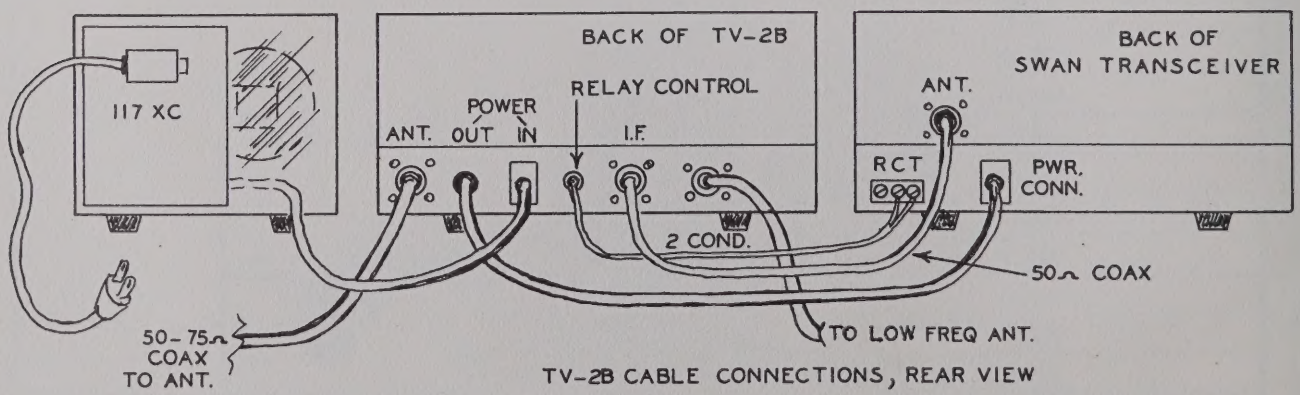
(b) For 6 meter model 250: Set the meter switch to output position, and adjust P.A. Plate and P.A. Load controls for maximum meter reading. (Transceiver Meter)

7.2 **TV-2B Tuning Adjustments**

(a) Set the TV-2B Meter Switch to OUTPUT, and the TV-2 P.A. LOAD control to ten, (3 o'clock). Switch the Transceiver to TUNE position, and quickly adjust DRIVER TUNE and P.A. TUNE on the TV-2 for maximum meter reading (TV-2 Meter). Switch the Transceiver back to RECEIVE mode.

(b) Switch the Transceiver to TUNE position, and quickly adjust the P.A. LOAD control on the TV-2B for maximum output reading. Then reset the TV-2 P.A. TUNE control again for maximum output. Repeat peaking of P.A. LOAD and P.A. TUNE controls until maximum output reading is reached. Switch the Transceiver back to RECEIVE mode.

(c) **TV-2B BIAS ADJUSTMENT** Switch the Transceiver to normal SSB mode, (By pressing the Push-To-Talk button on the mic. with most models). Adjust the Carrier Balance control for Carrier Null, (Minimum Carrier). Then set the P.A. BIAS control on back of the TV-2B 60 ma. reading on the TV-2B meter. Note that the TV-2B Meter Switch must be in CATHODE position for this adjustment.



TV-2B CABLE CONNECTIONS, REAR VIEW

(d) **TV-2B CATHODE CURRENT** After both the Transceiver and the TV-2B have been properly adjusted, normal cathode current reading on the TV-2B meter will be between 200 and 250 ma. in TUNE position. In SSB Transmit mode, adjust the Transceiver MIC. GAIN for an average TV-2B Cathode Meter reading of about 125 ma. MIC. GAIN setting will normally be about 9 to 10 o'clock.

7.3 **I.F. Leak-through**

Very strong signals in the I.F. range may leak-through, giving the impression that you are hearing a weak 2 meter signal when in fact it is a very strong signal coming through at the Transceiver frequency. Be sure to connect the three .01 mfd. bypass capacitors to the Auxiliary Relay Switching terminals inside the Transceiver, as described in Item 6.2.

If signals in the I.F. range are still leaking through, connect a short ground strap from the transceiver chassis to the Transverter chassis. This may be copper braid or strap, about ½ inch wide. Also, connect a good ground line to the chassis, from a ground rod or water pipe. Refer to Item 9.9, paragraph "I" for adjustment of the I.F. trap.

8.0 **CIRCUIT MODIFICATIONS WHEN CHANGING I.F. RANGE**

The following chart indicates what changes must be made in the TV-2B when converting to a different I.F. range.

I.F. Range	Crystal Freq. See Chart Pg. 4.	C108 (Across L802)	C109 (Across L101)	C707 (Across L708)
14 mc (Std.)	43 approx.	None	None	20 pf
21 mc	41 approx.	None	None	None
28 mc	39 approx.	5 pf	None	None
50 mc	31.333	20 pf	5 pf	None (Connect jumper across half of coil L702)

8.1 After making the circuit changes when changing I.F. range, it will be necessary to adjust each of the changed circuits; that is: permeability tune coils L802, L101 and L702. Refer to alignment instructions in section 9. on page 8.

TV-2B VOLTAGE CHART

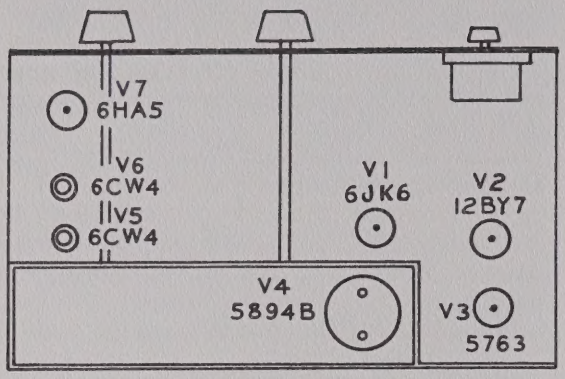
		E	B	C	
Q1	T	*-5.9	*-8.0	0	Transistors, V1 PIN 1, and V2 PIN 1, measured with A200 μHY choke in series with meter lead.
	R	*-5.9	*-8.0	0	
Q2	T	*-6.5	*-9.8	0	
	R	*-6.6	*-9.9	0	

PIN #	1	2	3	4	5	6	7	8	9	10	12
V1 T	*-2.38	.35	5.3AC	13.9AC	213	74	0				
V1											
V1 R	*-2.12	.41	5.3AC	13.9AC	241	83	0				
V2 T	*1.29	-7.12	0	13.9AC	13.9AC	5.3AC	237	181	0		
V3 T	258	NC	0	5.3AC	13.9AC	232	0	-7.95			
V4 T	0	*-33.3	258	.23	5.3AC	*-33.3	0	PLATES + 800VDC			
V5 R	—	59	—	0	—	—	—		—		0
V6 R	—	63	—	0	—	—	—	.46	—	6.3AC	0
V7 R	0	NC	13.9AC	6.3AC	136	0	2.29				

All measurements are ± 10%

Measurements made with 20,000Ω per volt meter. From point indicated to chassis ground. Use 1.8 μHY choke on all RF points except those noted above.

*These points greatly effected by crystal activity and proximity of test lead etc. May vary by as much as 30% under different conditions.



TV-2B TUBE LOCATION, TOP VIEW

9.1 An accurately calibrated Grid Dip Oscillator covering the necessary frequencies may be used to align the Transverter using the Grid Dip only. The procedure is the same except that you couple to the appropriate coil and tune the circuits for maximum indication on the Grid Dip Oscillator. For those without Grid Dip Oscillators, alignment can be accomplished with a meter as follows.

CAUTION

Dangerous high voltages are used in this unit. All safety precautions must be used at all times. Particularly when adjusting coupling to final tank circuit. Never touch anything inside the final tank circuit shield compartment with the power supply energized. Short tank circuit to ground after turning power supply off to bleed off filter capacitors before touching anything connected with the PA tank circuit.

EQUIPMENT NECESSARY FOR ALIGNMENT OF TRANSMITTER

VTVM — Hewlett Packard 410 B or equivalent.

Watt Meter with non-inductive load. Good for 125 watts or more at 144 to 148 mc (or dummy load) Output meter on Transverter may be substituted for watt meter.

Desirable but not necessary:

A. Grid Dip Oscillator (GDO) measurements corporation Model 59 equivalent.

B. Electronic Counter, or accurate receiver to check actual frequencies from 30 mc to 148 mc.

9.2 Disconnect screen voltage from final PA, V4 Pin 3, and V3 Pin 6.

9.3 Insert Hi, Low, and Mid range crystals in crystal sockets on top of chassis. (For selection of proper crystals see chart on page 4).

9.4 Oscillator Q1

A. Set Transverter crystal switch to low frequency crystal. Set VTVM on —1 volt DC scale. Ground lead to Transverter chassis, probe on Pin 1 of V1. Set core of L801 even with top of coil form, except for 50 mc I.F. set core ¼inch in winding. Adjust C804 for maximum indication on VTVM. Switch voltage off and on to see that crystal comes on every time.

If available, check frequency to see if crystal is in fact on proper overtone, with counter, receiver or GDO.

B. Same as in A, except switch transverter crystal SW to high end of band.

C. While switching between Hi and Low crystals, adjust C804 for same voltage indication on VTVM with either crystal. Peak L802 on Low crystal, then while switching between Hi and Low crystals readjust as necessary for same voltage indication on VTVM with either crystal. If necessary slightly adjust C804 for best balance.

9.5 **For I.F. ranges at 14, 21, and 28 mc:**

A. Set VTVM to —10 volt DC scale, and move probe to Pin 2 of V2 (12BY7 Transmitter Mixer Grid) set 4 gang tuning condenser (Driver Tune) ¼ open. Adjust core of L101 for maximum indication on VTVM. If equipment is available check to see that frequency is 3 times crystal overtone.

B. Repeat A, with 4 gang tuning condenser ¾ open, crystal switch on Hi crystal, and adjust C104 instead of L101.

C. Switch between 2.A and 2.B adjustments until no further improvement in tracking can be achieved.

With 50 mc I.F. Range:

Since the 50 mc I.F. requires only one crystal proceed as follows. Completely close C104 then back off 1¼ turns. Set 4 gang condenser to ½ open. Adjust L101 for maximum indication on VTVM.

9.6 Transmitter Mixer V2

A. It now becomes necessary to provide drive from the Swan Transceiver. See operating instructions and set for CW output.

B. Set Transceiver and Transverter for 144 mc. Set 4 gang cond. ¼ open. Connect probe on VTVM to Pin 8 or 9 of V3. Leave on —10 volt DC scale. Energize transmitter and adjust core of L201 for maximum indication on VTVM. If equipment is available check to see that frequency is 144 mc.

C. Same as A except 4 gang condenser ¾ open, Transceiver and Transverter adjusted to 148 mc. Tune C206 instead of L201 for maximum indication on VTVM.

D. Switching Transceiver and Transverter from Low to Hi ends of band, repeat 3.B

and 3.C adjustments until proper tracking is achieved.

9.7 Transmitter Driver V3

A. Connect screen of V3 (Pin 6). Set VTVM to —100 volt DC scale and connect probe to swinger on bias pot at rear of Transverter, R403 with voltages on but Transmitter not keyed, adjust bias pot for —30 volts DC.

B. Adjust Transceiver and Transverter for 144 mc. Key Transmitter and adjust core of L301 for maximum rise on VTVM. (Approximately 8 volts)

C. Adjust Transceiver and Transverter for 148 mc. Key Transmitter and adjust C301 for maximum rise on VTVM.

D. Switching between Hi and Low end of band (144-148 mc) Adjust as in 4.B and 4.C until tracking is achieved.

9.8 PA Final V4

A. Connect screen of final amplifier, V4 Pin 3. Connect 50 OHM load and watt meter to antenna jack on rear of Transverter. If watt meter is not available use the output meter on the Transverter as a relative indication. With no crystal in Oscillator circuit key Transmitter and adjust Bias control on rear of Transverter chassis (R403) for 60 ma of cathode current as indicated by the cathode switch position on the Transverter. Replace crystal.

B. Adjust Transceiver and Transverter for 148 mc. Key Transmitter and resonate final tank circuit. Load final tank circuit (Final plate and load interact, so repeak several times until no further improvement is noted).
If unable to fully load final, (at least 200 ma of cathode current), it may be necessary to adjust coupling between L402 and L403. **CAUTION** remove voltages and discharge filter capacitors before touching final tank circuit as 800 volts DC is connected to final tank circuit. **CAUTION** do not overcouple as poor signal will result.

C. Adjust coupling between L301 and L401 re-resonating C303 until maximum output is achieved as indicated by watt meter.

D. Repeak all trimmer condensers for maximum output on watt meter.

E. Set all controls for Low end of band, 144 mc. Resonate final load and PA tune. Adjust core in L301 for maximum output on watt meter. Peak output on watt meter by slight adjustment of cores in L101, L201 and L301.

F. At this point it may be necessary to slightly adjust L801 to balance maximum output at both ends of band. Do not adjust for maximum output at either end but for similar output as near as possible, unless all operation is intended at one end of band only.

G. Check output in middle of band. It should equal or exceed band edges.

H. Check carrier balance. If signal will not null, set is taking off, is mal-adjusted, or there is excessive carrier leak thru.

9.9 RECEIVER ALIGNMENT

Equipment necessary for alignment or receiver circuits. Signal generator covering 14 mc to 148 mc. Measurements Corp, Model 80 or equivalent. AC VTVM Hewlett Packard 410 B or equivalent.

A. Since Oscillator has already been done in Transmitter alignment no adjustment is necessary at this time.

B. During alignment of receiver keep PA plate of Transceiver and Driver Tune of Transverter peaked at the frequency being used for adjustment.

CAUTION during alignment of the Receiver do not key Transmitter as damage may result to the test equipment.

C. With the filament of V5 disconnected, feed a signal at 144 mc to the antenna input of the Transverter. Increase output of signal generator until signal is heard in the Transceiver. Adjust core of L502 for minimum signal and C501 for maximum signal.

D. Reduce output of signal generator and connect filament of V5 (Do Not solder at this time). When first RF stage has warmed up adjust core of L702 for maximum signal. To aid in finding peak, connect AC VTVM probe to Pin 12 of J404 being careful not to short any other pins.

E. Adjust coupling of L601 and L701 for maximum signal.

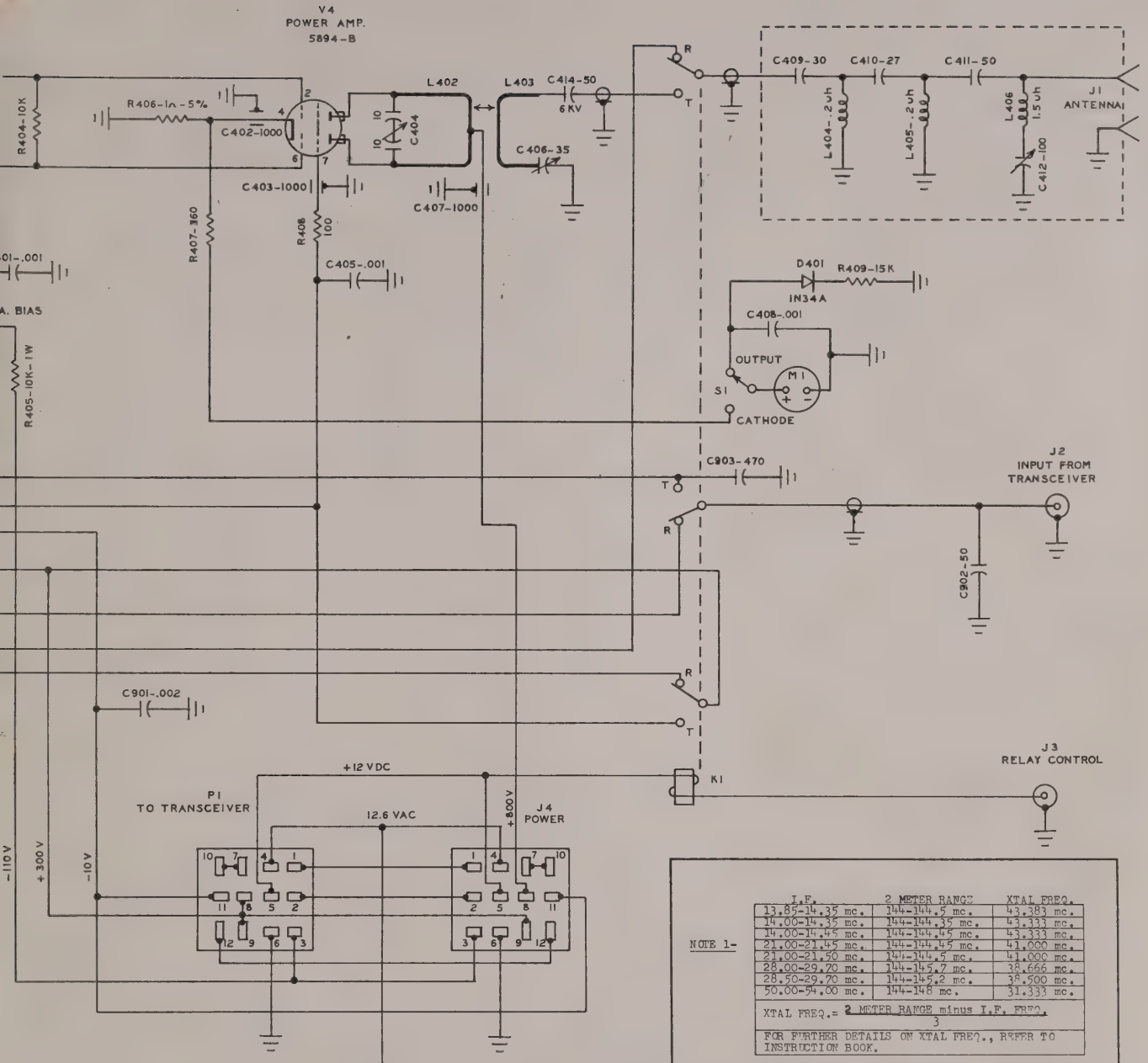
F. Using iron and brass cores check resonance of L501, L503, L601 and L701. Adjust as necessary. Recheck coupling L601 and L701 any time spacing of turns is altered.

G. Disconnect filament of V5 and again adjust L502 and C501 as in step C. Reconnect filament of V5 and solder.

H. Check mid frequency and high end of band. Make slight adjustments as necessary to achieve best over all performance. Adjust core of L702 at mid frequency. At this point also adjust L802 (Q2 Collector Coil), for maximum signal.

I. Set signal generator to frequency that the Transceiver is tuned to. (14, 21, 28 or 50 mc). Adjust trap at antenna input connector J401. Tune C412 for minimum signal output of receiver.

J. At 144 mc measure signal plus noise to noise ratio. It should be at least 8 db. If a noise generator is available, measure noise figure. It should be better than 3 db.



NOTE 1-	I.F.	2 METER RANGE	XTAL FREQ.
	13.85-14.35 mc.	144-144.5 mc.	43.383 mc.
	14.00-14.35 mc.	144-144.35 mc.	43.333 mc.
	14.00-14.45 mc.	144-144.45 mc.	43.333 mc.
	21.00-21.45 mc.	144-144.45 mc.	41.000 mc.
	21.00-21.50 mc.	144-144.5 mc.	41.000 mc.
	28.00-29.70 mc.	144-145.7 mc.	38.666 mc.
	28.50-29.70 mc.	144-145.2 mc.	38.500 mc.
	50.00-54.00 mc.	144-148 mc.	31.333 mc.

XTAL FREQ.= $\frac{\text{2 METER RANGE minus I.F. FREQ.}}{3}$

FOR FURTHER DETAILS ON XTAL FREQ., REFER TO INSTRUCTION BOOK.

NOTE 2-	I.F.	C108
	14,21 mc.	NONE
	28 mc.	5pf
	50 mc.	20pf

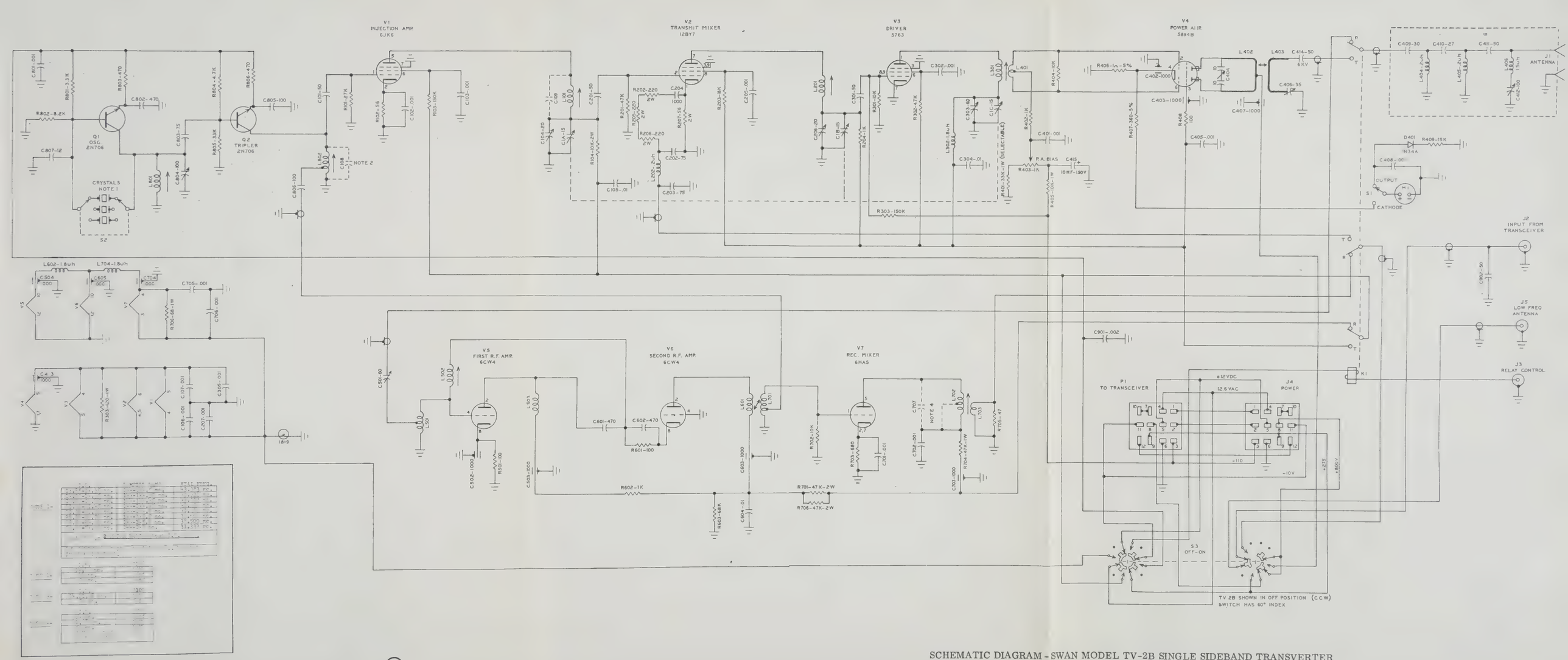
NOTE 3-	I.F.	C109
	14,21,28 mc.	NONE
	50 mc.	5pf

NOTE 4-	I.F.	C707
	14 mc.	20pf
	21,28 mc.	NONE
	50 mc.	NONE

CONNECT JUMPER ACROSS HALF OF L702

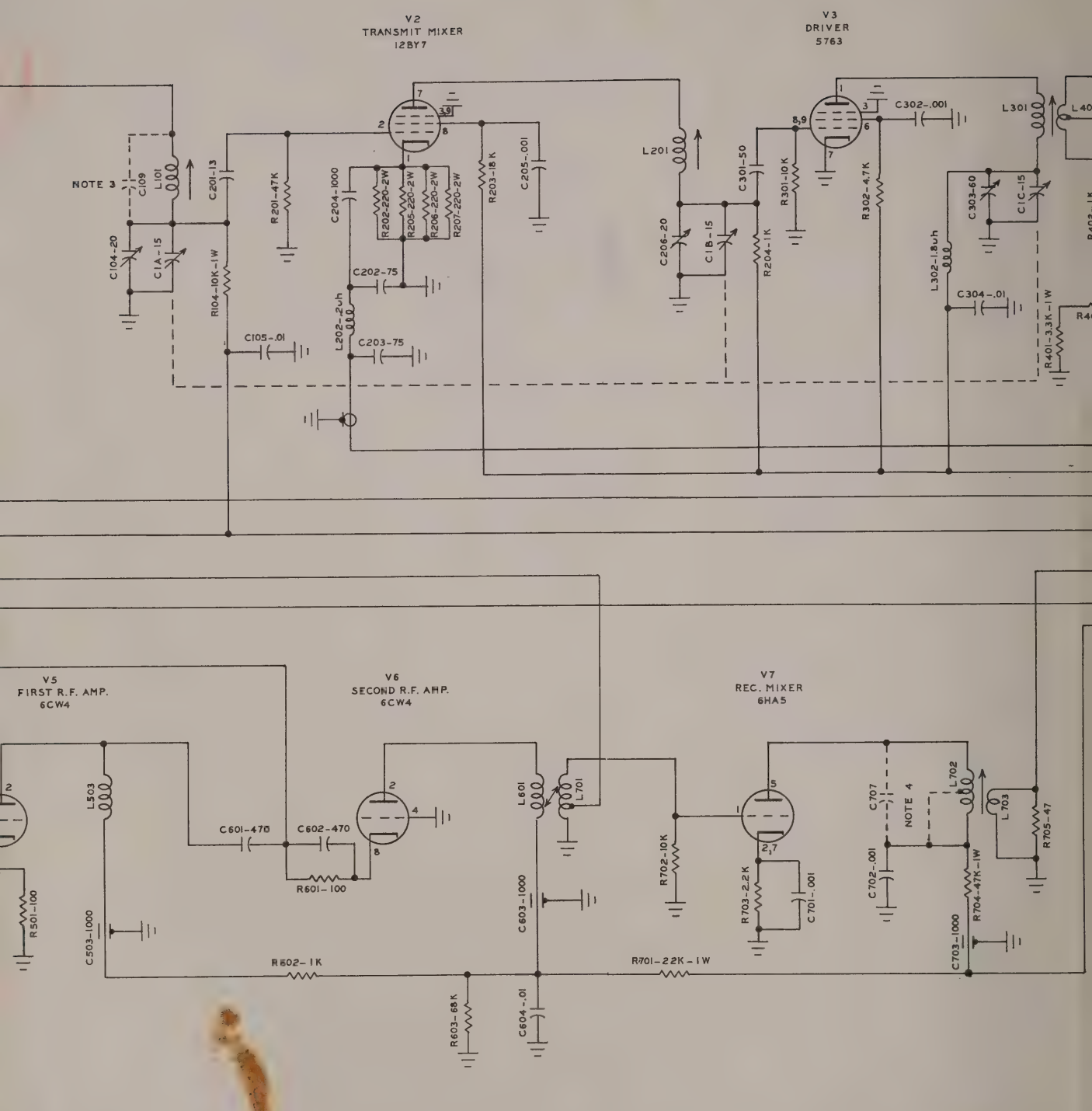
SCHEMATIC DIAGRAM - SWAN MODEL TV-2 SINGLE SIDEBAND TRANSVERTER

SWAN ELECTRONICS
Oceanside, California



SCHEMATIC DIAGRAM - SWAN MODEL TV-2B SINGLE SIDEBAND TRANSVERTER

12/16/68


V2
TRANSMIT MIXER
12BY7
V3
DRIVER
5763
NOTE 3
C109
L101
C104-20
C1A-15
C201-13
R104-10K-1W
C105-.01
R201-47K
C204-1000
R202-220-2W
R205-220-2W
R206-220-2W
R207-220-2W
C202-75
L202-2uh
C203-75
R203-18K
C205-.001
L201
C206-20
C1B-15
C301-50
R204-1K
R301-10K
R302-4.7K
C302-.001
L301
C303-60
C1C-15
L302-1.8uh
C304-.01
R401-3.3K-1W
V5
FIRST R.F. AMP.
6CW4
V6
SECOND R.F. AMP.
6CW4
V7
REC. MIXER
6HA5
L503
R501-100
C503-1000
C601-470
C602-470
R601-100
L601
L701
C603-1000
R602-1K
R603-68K
C604-.01
R702-10K
R703-2.2K
C701-.001
R701-22K-1W
C707
NOTE 4
C702-.001
L702
L703
R704-47K-1W
R705-47
C703-1000

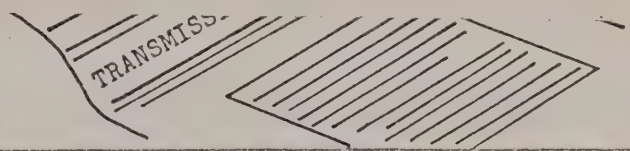
PARTS LIST CORRECTIONS

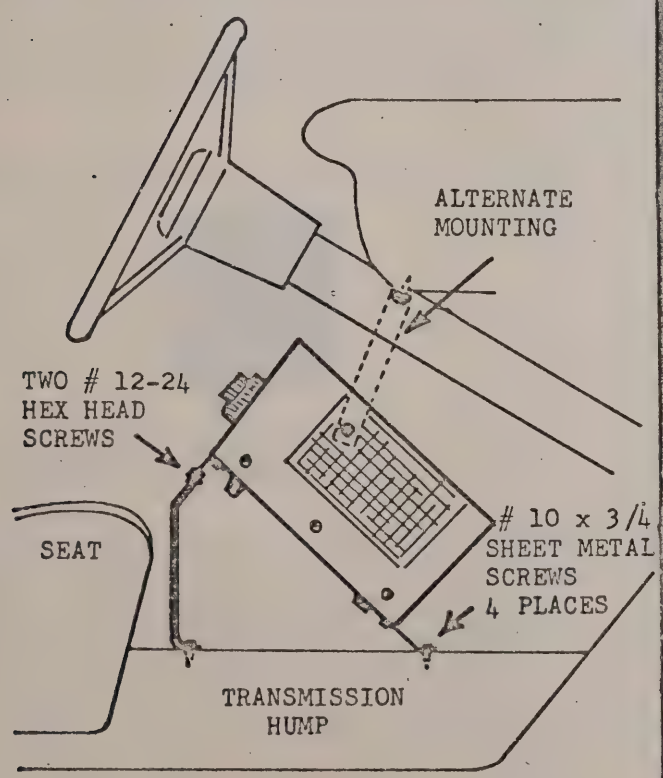
C202A,B	80-80-5-5 MFD 400 WV Elect.	C1904	150 MFD 150V Elect.
C406	.001, 20%	C1906	1 mf, 100 volt
C407	.001, 20%	C2013	22pf, N150
C807	15pf	R403	18K
C808	.01, +80-20	R1101	270K
C1303	.01, 1KV	R1102	10K
C1804	.01, +80-20	R1507	27 - 1W

SCHEMATIC CORRECTIONS

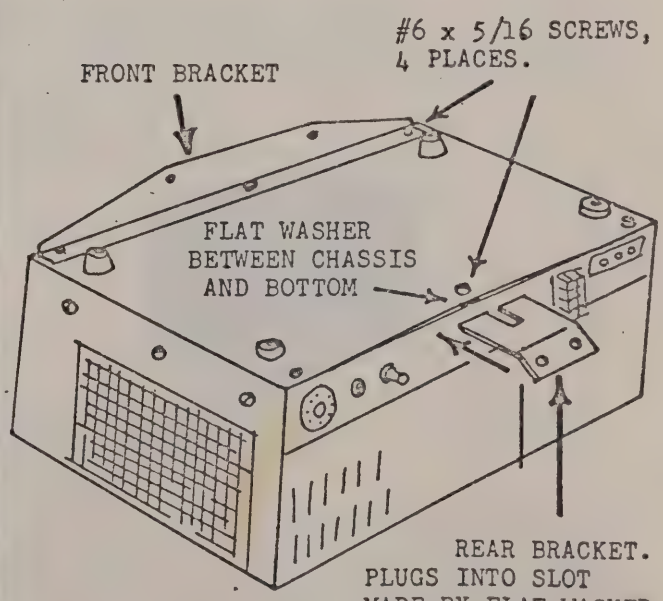
R301	100K	C406	.001, 20%
R1302	270K	C407	.001, 20%
D1701	1N2974A (NOTE: Zener voltage is -10 volts and not -12 volts as indicated on schematic.)		

Fig. 1 MOBILE MOUNTING ON TRANSMISSION HUMP UNDER DASH.



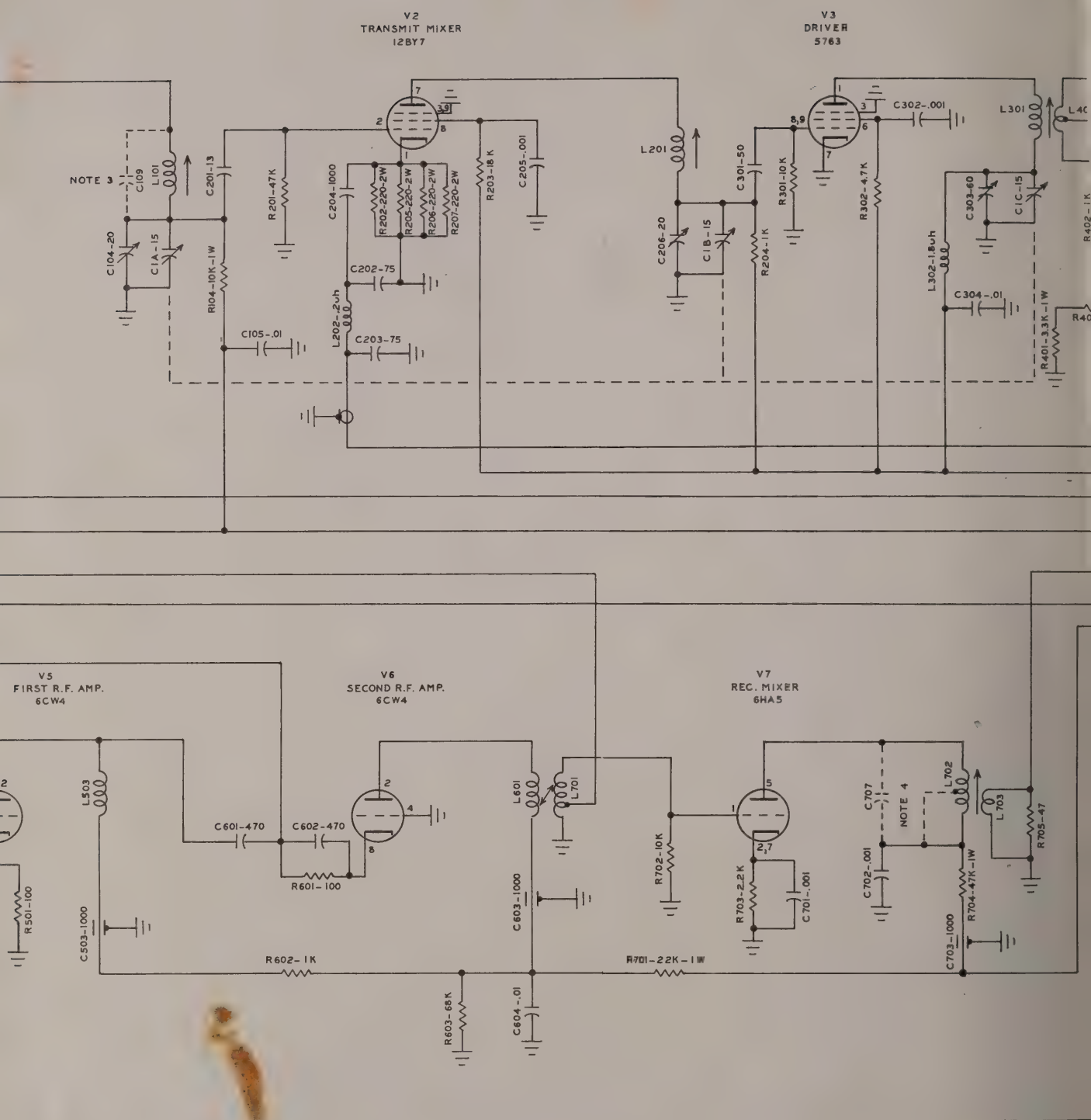


MOBILE MOUNTING, SIDE VIEW



TRANSCEIVER, BOTTOM VIEW

FIGURE 1. MOBILE INSTALLATION MOUNTING DETAILS


V2
TRANSMIT MIXER
12BY7
V3
DRIVER
5763
NOTE 3
C109
L101
C201-13
R201-47K
C204-1000
R202-220-2W
R205-220-2W
R206-220-2W
R207-220-2W
R203-18K
C205-.001
L201
C301-50
R301-10K
C302-.001
L301
C104-20
C1A-15
R104-10K-1W
C105-.01
C202-75
L202-2uh
C203-75
C206-20
C1B-15
R204-1K
R302-4.7K
C303-60
C1C-15
L302-1.8uh
C304-.01
R401-3.3K-1W
V5
FIRST R.F. AMP.
6CW4
V6
SECOND R.F. AMP.
6CW4
V7
REC. MIXER
6HA5
L503
C601-470
C602-470
R601-100
L601
L701
R702-10K
C707
NOTE 4
L702
L703
R705-47
R501-100
C503-1000
C603-1000
R703-2.2K
C701-.001
C702-.001
R704-47K-1W
C703-1000
R602-1K
R701-22K-1W
R603-68K
C604-.01

PARTS LIST CORRECTIONS

C202A,B	80-80-5-5 MFD 400 WV Elect.	C1904	150 MFD 150V Elect.
C406	.001, 20%	C1906	1 mf, 100 volt
C407	.001, 20%	C2013	22pf, N150
C807	15pf	R403	18K
C808	.01, +80-20	R1101	270K
C1303	.01, 1KV	R1102	10K
C1804	.01, +80-20	R1507	27 - 1W

SCHEMATIC CORRECTIONS

R301	100K	C406	.001, 20%
R1302	270K	C407	.001, 20%
D1701	1N2974A (NOTE: Zener voltage is -10 volts and not -12 volts as indicated on schematic.)		

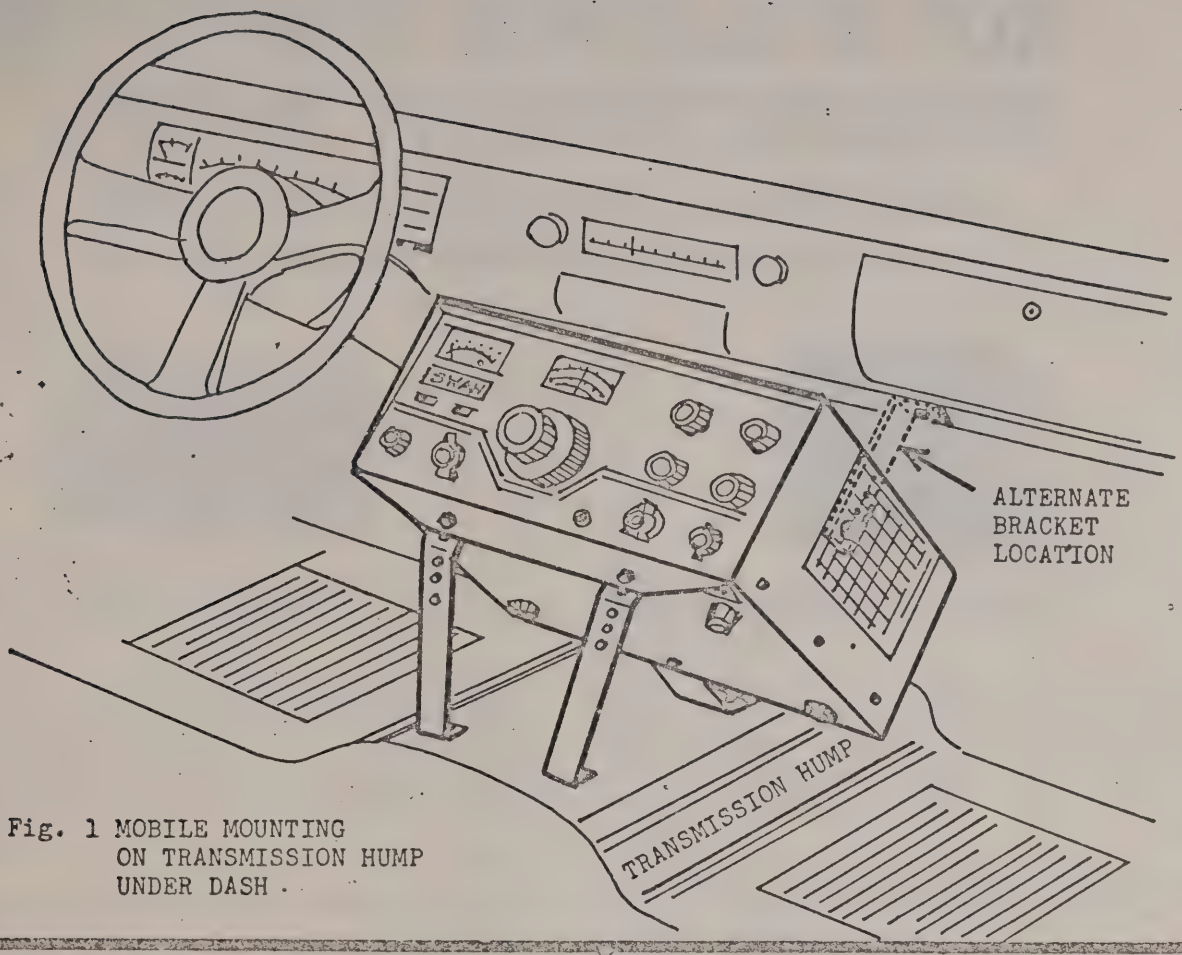
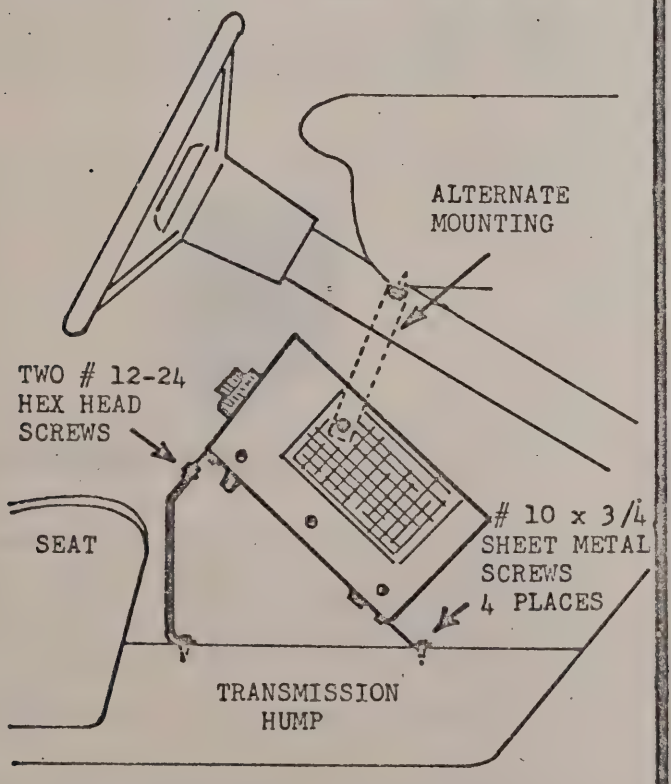
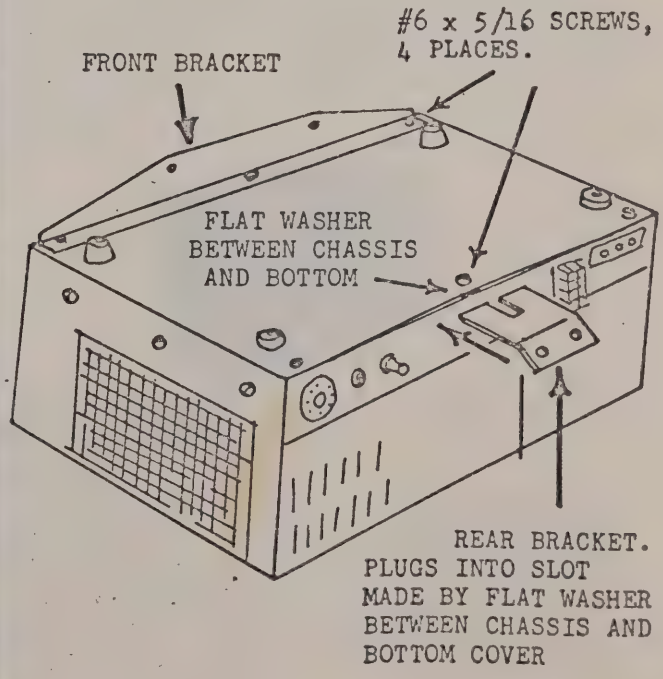


Fig. 1 MOBILE MOUNTING
ON TRANSMISSION HUMP
UNDER DASH .



MOBILE MOUNTING, SIDE VIEW

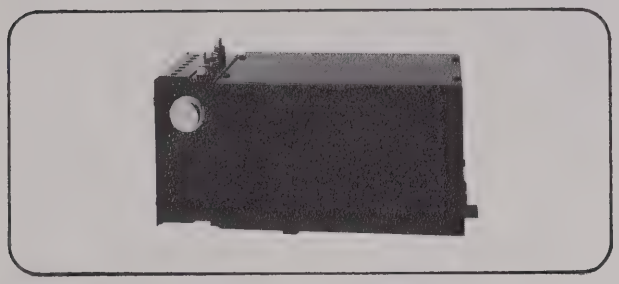


TRANSCEIVER, BOTTOM VIEW

FIGURE 1. MOBILE INSTALLATION
MOUNTING DETAILS

POWER SUPPLIES FOR SWAN TRANSCEIVERS

Models 240, 400, 250 Series, 350 Series, and 500 Series. Also 300 Series and 400 Series Commercial Models.



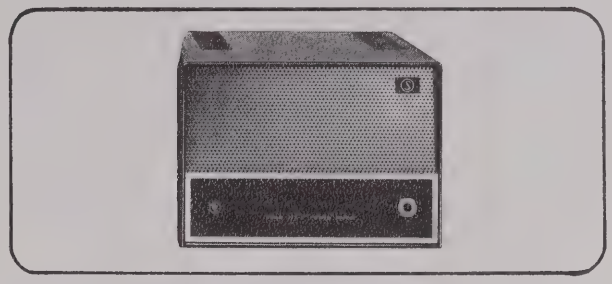
COMPLETE 12 VOLT D.C. SUPPLY

MODEL 14-117

Consists of a 117-X A.C. supply and a 14-C D.C. Converter. For 12-13.5 volt mobile or portable operation. Includes 8 ft. cable and plug pre-wired for connection to transceiver, primary cables, circuit breaker, and mounting hardware. 5 in. wide, 5 in. high, 12-1/4 in. long. Weight: 16-1/2 lbs.
Net Price . . . . . **$118.**

MODEL 14-230. Same as above but with 230-X A.C. unit.
Net Price . . . . . **$124.**

Model 14-117 and 14-230 D.C. supplies will operate on A.C. input by detaching the 14-C unit and attaching an A.C. line cord, thus providing added versatility. 117 volt and 230 volt A.C. line cords available at $8 each.



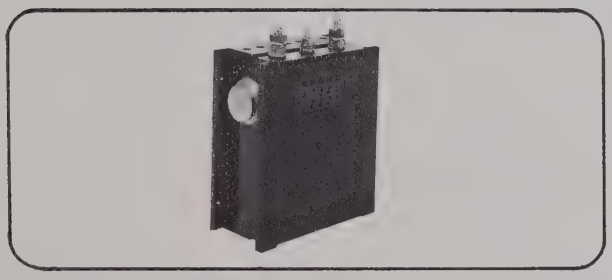
COMPLETE MATCHING A.C. SUPPLY

MODEL 117-XC

Consists of a 117-X power supply in a cabinet which matches Swan transceiver. Includes speaker, phone jack, and indicator light. Come with A.C. line cord, and power cable ready to plug into transceiver. 8 in. wide, 5-1/4 in. high, 11 in. deep. Weight: 21 lbs.
Net Price . . . . . **$95.**

MODEL 230-XC. Same as above but with 230-X supply for dual 117 or 230 volt A.C. input. Comes with 230 volt line cord, unless otherwise specified.
Net Price . . . . . **$99.**

Model 117-XC and 230-XC A.C. supplies will operate on 12-13.5 volts D.C. input by attaching a 14-C Converter Unit in place of the A.C. line cord, thus providing added versatility for portable or emergency operation from a 12 volt battery.

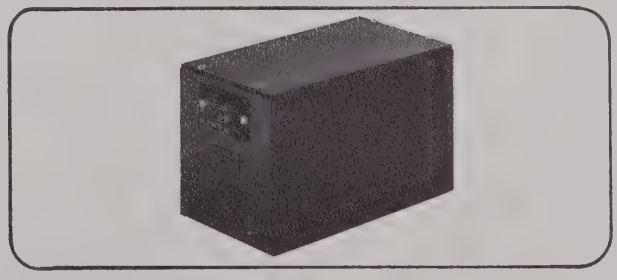


D.C. CONVERTER MODULE

MODEL 14-C

Transistorized Unit attaches to 117-X or 230-X power supply, converting them to 12-13.5 volt D.C. input for mobile or portable operation. For negative ground systems. Includes cables, plugs, circuit breaker, and mounting hardware. Average current drain: 9 amps. receive. 22 amps. transmit.
Dimensions: 5 x 5 x 3-1/2 in. Weight: 2-1/2 lbs.
Net Price . . . . . **$59.**

MODEL 14-CP. Same as above but for positive ground system. Available on special order . . . . . **$59.**



BASIC A.C. POWER SUPPLY

MODEL 117-X

Operates with 117-volts, 50-60 cycle input. Supplies all voltages required to operate Swan transceiver. Does not include matching cabinet, speaker or cables. Average power consumption: 125 watts, receive; 325 watts, transmit.
Dimensions: 5 x 5 x 8-3/4 in. Weight: 14 lbs.
Net Price . . . . . **$59.**

MODEL 230-X. Same as above but with dual primary winding for either 117 or 230 volt 50-60 cycle input . **$65.**

A.C. line cords for above supplies, with fuse, ready to plug in. Specify for 117 or 230 volts, each . . . . . **$8.**

8 ft. 10 conductor cable with pre-wired plug for connecting A.C. supply to transceiver, each . . . . . **$6.**

GENERAL DESCRIPTION:

The Swan Power Supply systems are designed to provide all necessary voltages required by Swan Transceiver models 240, 400, 250 Series, 350 Series, and 500 Series. This also includes the 300 Series and 400 Series commercial models. The model 117-X basic A.C. supply is designed for an input of 117 volts at 50 or 60 cycles. The model 230-X is identical except that it operates with 230 volts AC input. By simply changing line cords, it will also operate on 117 volts A.C.

For fixed station use, the 117-X or 230-X is installed in a cabinet which matches the Swan transceivers. This cabinet also contains a speaker, phone jack, and indicator light. The complete combination is designated as model 117-XC or 230-XC. The A.C. line cord plugs into the back of the supply. In the 230-XC, choice of 117 or 230 volts input is made by selecting line cords.

12 VOLT D.C. OPERATION:

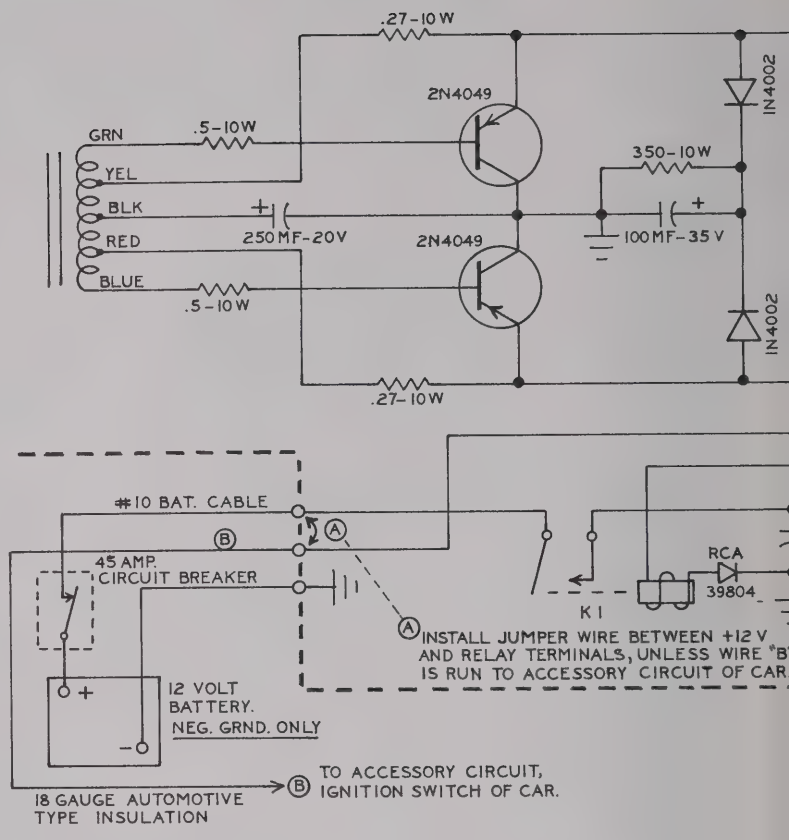
A D.C. Converter attaches to the back of the A.C. supply, and converts it for 12-13.5 volts D.C. input. The model 14-C D.C. Converter is for negative ground systems, the most common type. (For positive ground systems, the model 14-CP D.C. Converter is available on special order.) Combination of an A.C. supply with a 14-C Converter is designated as model 14-117 or 14-230 depending on which A.C. supply is used. The positive ground models are designated as model 14P-117 or 14P-230.

With the versatility of this power supply design, a number of advantages become apparent. The 14-117 mobile supply may be operated from a 117 volt A.C. line by detaching the D.C. Converter and plugging in an A.C. line cord.

The matching A.C. supply, model 117-XC or 230-XC, may be converted easily to 12-13.5 volts input by attaching the 14-C D.C. Converter to the back. This provides for portable or emergency operation from a 12 volt battery. There may also be times when it will be desirable to operate temporarily in an automobile, such as during a vacation trip, field day, or emergencies. The 117-XC can be set on the floor or front seat, and with the 14-C attached it becomes a 12-volt power supply, complete with speaker.

SPECIFICATIONS:

Power Rating: 250 watts average, 600 watts peak.
Input:
- Model 117-X: 117 volts nominal, 50-60 cycles.
- Model 230-X: 230 volts or 117 volts, 50-60 cycles.
- Model 14-C : 13.5 volts D.C. nominal, 40 amps. peak.



MODEL 14-
D.C. CONVERT
11-16

Output:
- 800 volts at 250 ma. average, 700 ma. peak.
- 275 volts at 150 ma. continuous.
- 110 volts negative bias, at 100 ma.
- 12 volts D.C. at 200 ma., relay supply.
- 12.6 volts A.C. at 5.5 amps. (with A.C. input only)

Battery Drain with Swan Transceiver
- Rec: 3.5 amps. Trans: 16 amps. average, 40 amps. peak, plus 5.5 amps. for vacuum tube heaters.

The D.C. Converter uses two power transistors for switching in a flip-flop oscillator circuit. A large portion of the cost in this unit is in the transistors where no compromise has been made. They are rated at 60 amperes, with a 45 volt rating.

relay draws very little current, tapping into the car radio line will not matter, regardless of which side the car radio fuse is on.

(F) Speaker Connections. The two conductor lead coming from the Jones plug goes to an external speaker with 3 to 4 ohm voice coil. This speaker may be one already installed in the dash of the car or under the dash, and a selector switch may be installed to switch the speaker over from the car radio to the transceiver. An easier arrangement, however, is to install a 3 x 5 in. speaker inside the transceiver. The 500-C provides a mounting place on the left side, with terminal lugs on top of the chassis for connection to the speaker. One side of the speaker voice coil connects to the insulated terminal, and the other side connects to the ground terminal.

VOLTAGE REGULATION, MOBILE OPERATION

In D.C. to D.C. converters designed for mobile operation of Transceivers, it is important to note that output voltages will be related directly to the D.C. input voltage. The Swan model 14-117 supply is designed so that when input voltage is 13.5 volts, output voltages will be at nominal ratings, the same as with 117 volts A.C. input. Therefore, when Transceiver Tuning is performed without the engine running, it must be recognized that operating voltages will be considerably lower than normal, and meter readings will be less than with the engine running. In some cases, input voltage without the engine running may be as low as 11.5 volts, resulting in still lower meter readings. If the D.C. supply were designed to deliver normal output voltages at 11.5 or 12 volts input, then they would be dangerously high with the engine running.

The wire size and length of run from the battery to the 14-C Converter is also an important factor governing output voltage from the power supply. The voltage drop across these leads should be kept reasonably small. 10 gauge wire is supplied with the 14-C Converter, and is heavy enough for average runs of 3 to 4 feet. For longer runs it would be advisable to use 8 gauge, while for trunk mounted power supplies 6 gauge or even 4 gauge is recommended. It should be noted, however, that the really important factor in determining wire size is how much input voltage is delivered to the 14-C module during average voice modulation, when some 16 to 18 amperes are being drawn through the wire. In TUNE position considerably more current is drawn, as much as 35 to 40 amperes, and the voltage drop may be quite high. However, this is not a particular handicap; in fact, there is a definite safety factor in having a rather poorly regulated input which drops when you switch to TUNE. There is no reason to be unduly concerned about this drop, since the electrolytic capacitors in the power supply have ample storage capacity to provide good dynamic regulation during voice modulation.

To summarize: The best way of determining if the battery leads are large enough is to measure input voltage at the 14-C terminals while voice modulating. If the voltage drops less than 1/2 volt when speaking normally into the microphone, the leads are heavy enough. If the drop is more than 1/2 volt, the leads should be larger. Finally, do not expect full operating power unless the engine is running, and the generator is charging properly.

POWER SUPPLY WARRANTY POLICY

The normal guarantee on your Swan power supply is for a period of 90 days from date of purchase, and covers all components, material and workmanship. In the case of transistor failure, however, the warranty on them will be void if inspection proves that high transient voltages from the automobile were responsible. We will do all in our power to be fair and just in this determination. The warranty card must be filled out and mailed to the factory within 10 days from date of purchase. Do not ship a unit to the factory for servicing without prior authorization. Check with your dealer first, as he may be in a position to handle the service work more quickly. This warranty is void if the equipment has been misused or damaged.

GENERAL DESCRIPTION:

The Swan Power Supply systems are designed to provide all necessary voltages required by Swan Transceiver models 240, 400, 250 Series, 350 Series, and 500 Series. This also includes the 300 Series and 400 Series commercial models. The model 117-X basic A.C. supply is designed for an input of 117 volts at 50 or 60 cycles. The model 230-X is identical except that it operates with 230 volts AC input. By simply changing line cords, it will also operate on 117 volts A.C.

For fixed station use, the 117-X or 230-X is installed in a cabinet which matches the Swan transceivers. This cabinet also contains a speaker, phone jack, and indicator light. The complete combination is designated as model 117-XC or 230-XC. The A.C. line cord plugs into the back of the supply. In the 230-XC, choice of 117 or 230 volts input is made by selecting line cords.

12 VOLT D.C. OPERATION:

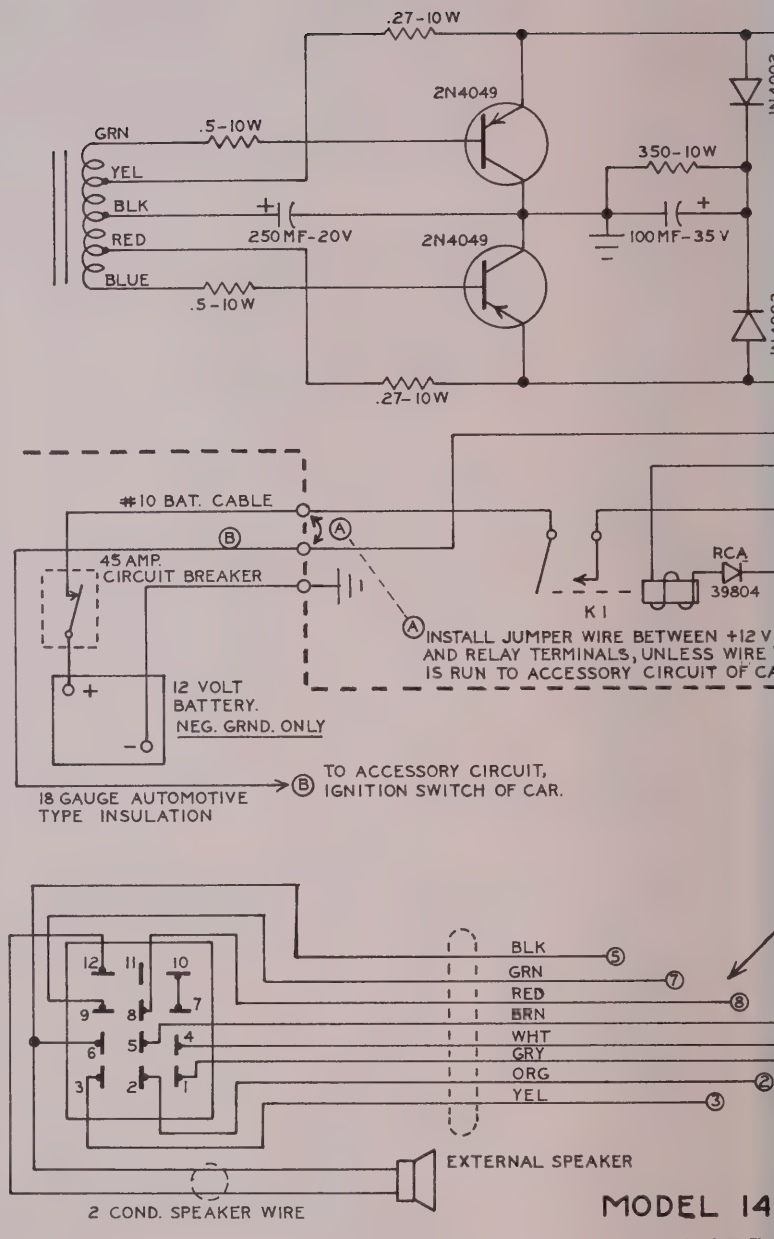
A D.C. Converter attaches to the back of the A.C. supply, and converts it for 12-13.5 volts D.C. input. The model 14-C D.C. Converter is for negative ground systems, the most common type. (For positive ground systems, the model 14-CP D.C. Converter is available on special order.) Combination of an A.C. supply with a 14-C Converter is designated as model 14-117 or 14-230 depending on which A.C. supply is used. The positive ground models are designated as model 14P-117 or 14P-230.

With the versatility of this power supply design, a number of advantages become apparent. The 14-117 mobile supply may be operated from a 117 volt A.C. line by detaching the D.C. Converter and plugging in an A.C. line cord.

The matching A.C. supply, model 117-XC or 230-XC, may be converted easily to 12-13.5 volts input by attaching the 14-C D.C. Converter to the back. This provides for portable or emergency operation from a 12 volt battery. There may also be times when it will be desirable to operate temporarily in an automobile, such as during a vacation trip, field day, or emergencies. The 117-XC can be set on the floor or front seat, and with the 14-C attached it becomes a 12-volt power supply, complete with speaker.

SPECIFICATIONS:

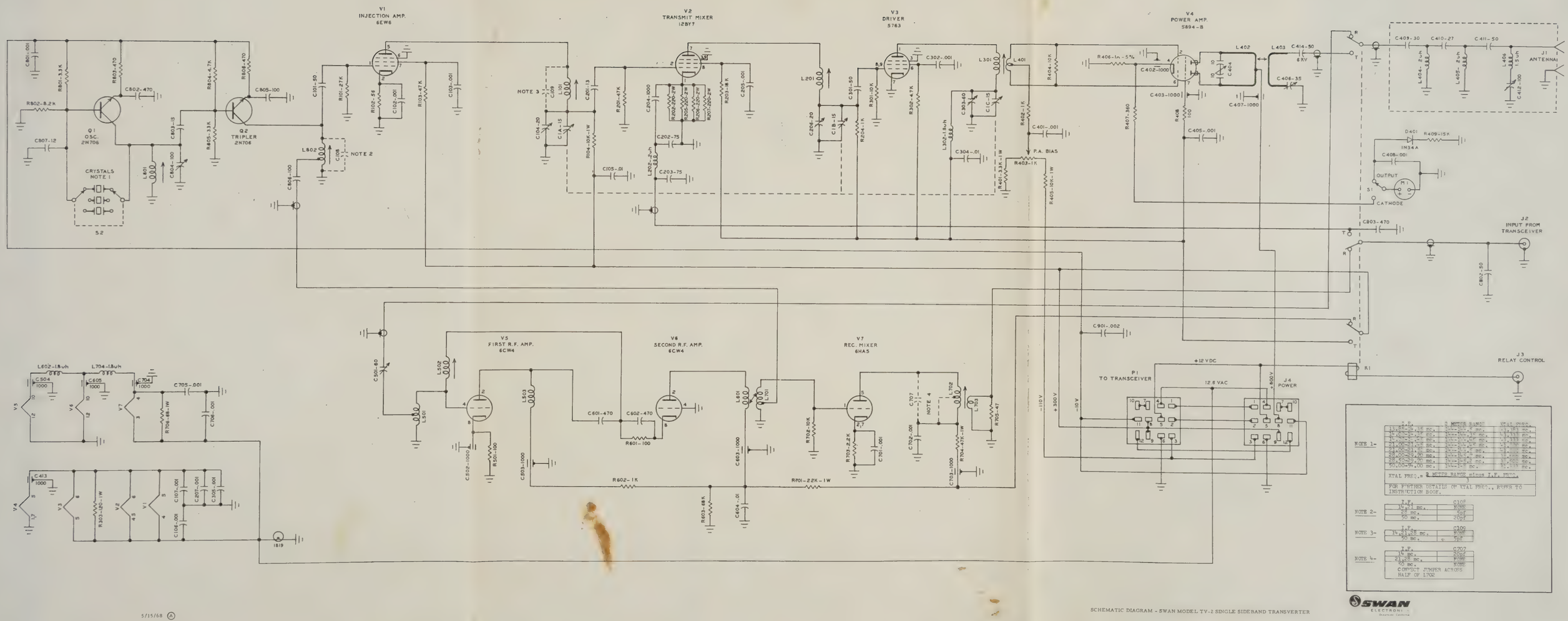
Power Rating: 250 watts average, 600 watts peak.
Input:
- Model 117-X: 117 volts nominal, 50-60 cycles.
- Model 230-X: 230 volts or 117 volts, 50-60 cycles.
- Model 14-C : 13.5 volts D.C. nominal, 40 amps. peak.



Output:
- 800 volts at 250 ma. average, 700 ma. peak.
- 275 volts at 150 ma. continuous.
- 110 volts negative bias, at 100 ma.
- 12 volts D.C. at 200 ma., relay supply.
- 12.6 volts A.C. at 5.5 amps. (with A.C. input only)

Battery Drain with Swan Transceiver
- Rec: 3.5 amps. Trans: 16 amps. average, 40 amps. peak, plus 5.5 amps. for vacuum tube heaters.

The D.C. Converter uses two power transistors for switching in a flip-flop oscillator circuit. A large portion of the cost in this unit is in the transistors where no compromise has been made. They are rated at 60 amperes, with a 45 volt rating.



T.P.	2 METER BAND*	XTAL FREQ.
14.67-14.75 mc.	144-148 mc.	9.833 mc.
14.75-14.83 mc.	148-152 mc.	9.883 mc.
14.83-14.91 mc.	152-156 mc.	9.933 mc.
14.91-14.99 mc.	156-160 mc.	9.983 mc.
14.99-15.07 mc.	160-164 mc.	10.033 mc.
15.07-15.15 mc.	164-168 mc.	10.083 mc.
15.15-15.23 mc.	168-172 mc.	10.133 mc.
15.23-15.31 mc.	172-176 mc.	10.183 mc.
15.31-15.39 mc.	176-180 mc.	10.233 mc.
15.39-15.47 mc.	180-184 mc.	10.283 mc.
15.47-15.55 mc.	184-188 mc.	10.333 mc.
15.55-15.63 mc.	188-192 mc.	10.383 mc.
15.63-15.71 mc.	192-196 mc.	10.433 mc.
15.71-15.79 mc.	196-200 mc.	10.483 mc.
15.79-15.87 mc.	200-204 mc.	10.533 mc.
15.87-15.95 mc.	204-208 mc.	10.583 mc.
15.95-16.03 mc.	208-212 mc.	10.633 mc.
16.03-16.11 mc.	212-216 mc.	10.683 mc.
16.11-16.19 mc.	216-220 mc.	10.733 mc.
16.19-16.27 mc.	220-224 mc.	10.783 mc.
16.27-16.35 mc.	224-228 mc.	10.833 mc.
16.35-16.43 mc.	228-232 mc.	10.883 mc.
16.43-16.51 mc.	232-236 mc.	10.933 mc.
16.51-16.59 mc.	236-240 mc.	10.983 mc.
16.59-16.67 mc.	240-244 mc.	11.033 mc.
16.67-16.75 mc.	244-248 mc.	11.083 mc.
16.75-16.83 mc.	248-252 mc.	11.133 mc.
16.83-16.91 mc.	252-256 mc.	11.183 mc.
16.91-16.99 mc.	256-260 mc.	11.233 mc.
16.99-17.07 mc.	260-264 mc.	11.283 mc.
17.07-17.15 mc.	264-268 mc.	11.333 mc.
17.15-17.23 mc.	268-272 mc.	11.383 mc.
17.23-17.31 mc.	272-276 mc.	11.433 mc.
17.31-17.39 mc.	276-280 mc.	11.483 mc.
17.39-17.47 mc.	280-284 mc.	11.533 mc.
17.47-17.55 mc.	284-288 mc.	11.583 mc.
17.55-17.63 mc.	288-292 mc.	11.633 mc.
17.63-17.71 mc.	292-296 mc.	11.683 mc.
17.71-17.79 mc.	296-300 mc.	11.733 mc.
17.79-17.87 mc.	300-304 mc.	11.783 mc.
17.87-17.95 mc.	304-308 mc.	11.833 mc.
17.95-18.03 mc.	308-312 mc.	11.883 mc.
18.03-18.11 mc.	312-316 mc.	11.933 mc.
18.11-18.19 mc.	316-320 mc.	11.983 mc.
18.19-18.27 mc.	320-324 mc.	12.033 mc.
18.27-18.35 mc.	324-328 mc.	12.083 mc.
18.35-18.43 mc.	328-332 mc.	12.133 mc.
18.43-18.51 mc.	332-336 mc.	12.183 mc.
18.51-18.59 mc.	336-340 mc.	12.233 mc.
18.59-18.67 mc.	340-344 mc.	12.283 mc.
18.67-18.75 mc.	344-348 mc.	12.333 mc.
18.75-18.83 mc.	348-352 mc.	12.383 mc.
18.83-18.91 mc.	352-356 mc.	12.433 mc.
18.91-18.99 mc.	356-360 mc.	12.483 mc.
18.99-19.07 mc.	360-364 mc.	12.533 mc.
19.07-19.15 mc.	364-368 mc.	12.583 mc.
19.15-19.23 mc.	368-372 mc.	12.633 mc.
19.23-19.31 mc.	372-376 mc.	12.683 mc.
19.31-19.39 mc.	376-380 mc.	12.733 mc.
19.39-19.47 mc.	380-384 mc.	12.783 mc.
19.47-19.55 mc.	384-388 mc.	12.833 mc.
19.55-19.63 mc.	388-392 mc.	12.883 mc.
19.63-19.71 mc.	392-396 mc.	12.933 mc.
19.71-19.79 mc.	396-400 mc.	12.983 mc.

XTAL FREQ.= 2 METER BAND minus I.F. FREQ.

FOR FURTHER DETAILS OF XTAL FREQ., REFER TO INSTRUCTION BOOK.

NOTE 1-

NOTE 2-

I.F.	C108
14.41 mc.	NONE
28 mc.	50pf
50 mc.	20pf

NOTE 3-

I.F.	C109
14.41-14.28 mc.	NONE
50 mc.	75pf

NOTE 4-

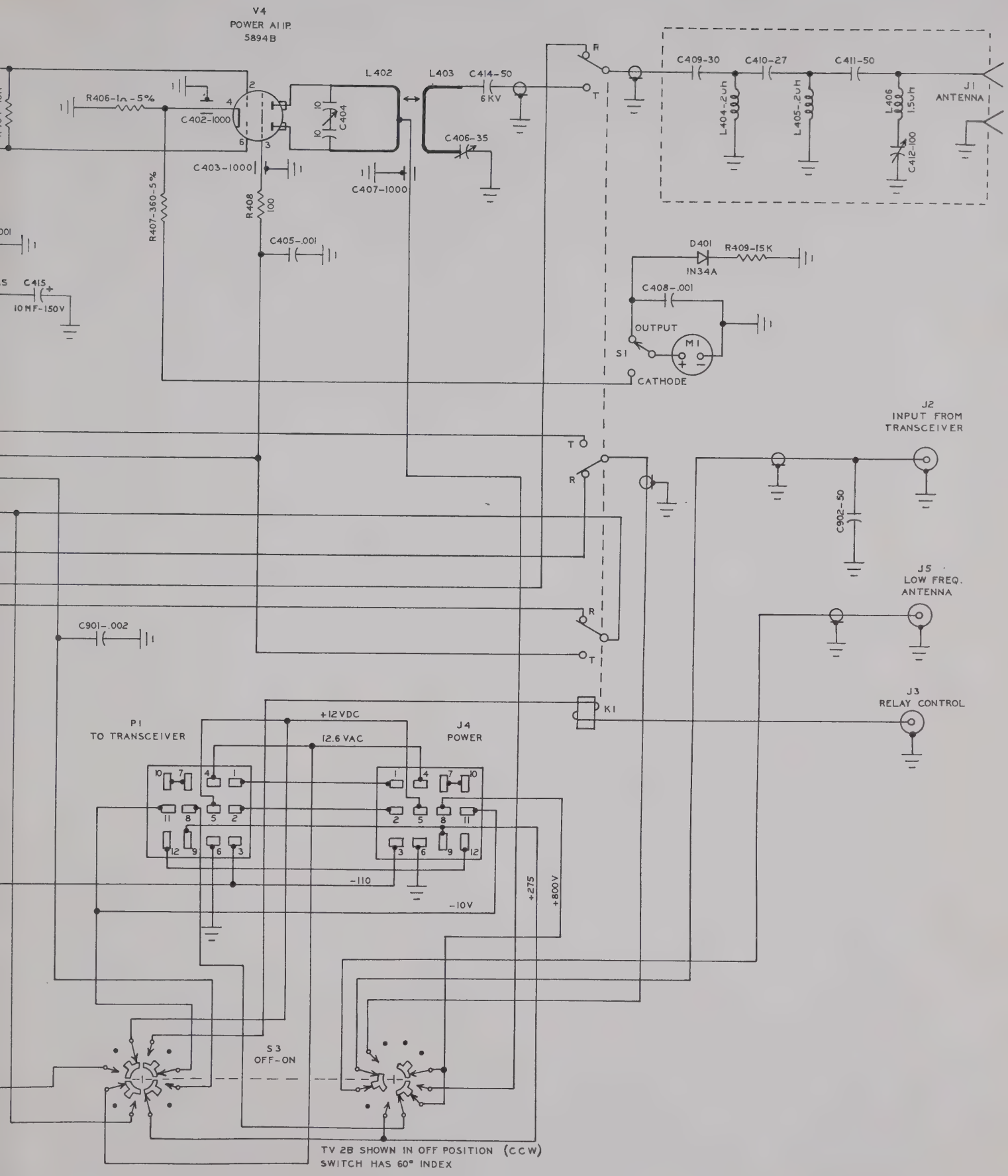
I.F.	C702
14 mc.	20pf
21.28 mc.	NONE
50 mc.	NONE

CONNECT JUMPER ACROSS HALF OF L702

5/15/68 (A)

SCHEMATIC DIAGRAM - SWAN MODEL TV-2 SINGLE SIDEBAND TRANSVERTER

SWAN ELECTRONICS



WAN MODEL TV-2B SINGLE SIDEBAND TRANSVERTER

GENERAL DESCRIPTION:

The Swan Power Supply systems are designed to provide all necessary voltages required by Swan Transceiver models 240, 400, 250 Series, 350 Series, and 500 Series. This also includes the 300 Series and 400 Series commercial models. The model 117-X basic A.C. supply is designed for an input of 117 volts at 50 or 60 cycles. The model 230-X is identical except that it operates with 230 volts AC input. By simply changing line cords, it will also operate on 117 volts A.C.

For fixed station use, the 117-X or 230-X is installed in a cabinet which matches the Swan transceivers. This cabinet also contains a speaker, phone jack, and indicator light. The complete combination is designated as model 117-XC or 230-XC. The A.C. line cord plugs into the back of the supply. In the 230-XC, choice of 117 or 230 volts input is made by selecting line cords.

12 VOLT D.C. OPERATION:

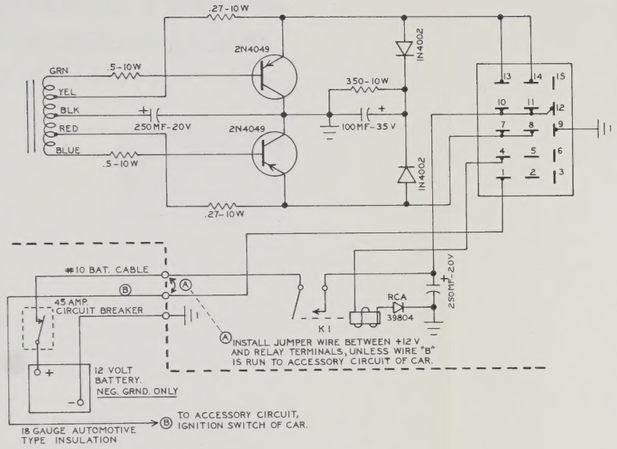
A D.C. Converter attaches to the back of the A.C. supply, and converts it for 12-13.5 volts D.C. input. The model 14-C D.C. Converter is for negative ground systems, the most common type. (For positive ground systems, the model 14-CP D.C. Converter is available on special order.) Combination of an A.C. supply with a 14-C Converter is designated as model 14-117 or 14-230 depending on which A.C. supply is used. The positive ground models are designated as model 14P-117 or 14P-230.

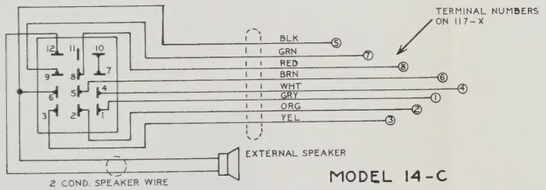
With the versatility of this power supply design, a number of advantages become apparent. The 14-117 mobile supply may be operated from a 117 volt A.C. line by detaching the D.C. Converter and plugging in an A.C. line cord.

The matching A.C. supply, model 117-XC or 230-XC, may be converted easily to 12-13.5 volts input by attaching the 14-C D.C. Converter to the back. This provides for portable or emergency operation from a 12 volt battery. There may also be times when it will be desirable to operate temporarily in an automobile, such as during a vacation trip, field day, or emergencies. The 147-XC can be set on the floor or front seat, and with the 14-C attached it becomes a 12-volt power supply, complete with speaker.

SPECIFICATIONS:

Power Rating: 250 watts average, 600 watts peak.
Input:
- Model 117-X: 117 volts nominal, 50-60 cycles.
- Model 230-X: 230 volts or 117 volts, 50-60 cycles.
- Model 14-C : 13.5 volts D.C. nominal, 40 amps. peak.



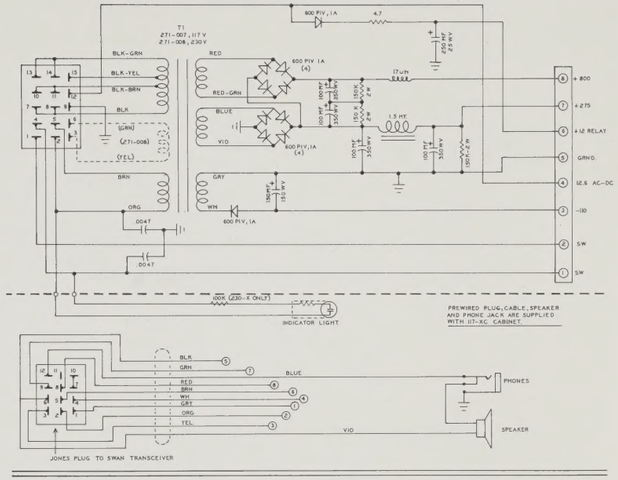


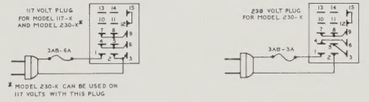
MODEL 14-C
D.C. CONVERTER
11-16-70

Output:
- 800 volts at 250 ma. average, 700 ma. peak.
- 275 volts at 150 ma. continuous.
- 110 volts negative bias, at 100 ma.
- 12 volts D.C. at 200 ma., relay supply.
- 12.6 volts A.C. at 5.5 amps. (with A.C. input only)

Battery Drain with Swan Transceiver
Rec: 3.5 amps. Trans: 16 amps. average, 40 amps. peak, plus 5.5 amps. for vacuum tube heaters.

The D.C. Converter uses two power transistors for switching in a flip-flop oscillator circuit. A large portion of the cost in this unit is in the transistors where no compromise has been made. They are rated at 60 amperes, with a 45 volt rating.





SCHEMATIC DIAGRAM

SWAN MODEL 117-X (230-X) A.C. POWER SUPPLY

MATCHING CABINET:

Ordinarily the A.C. supply will be purchased complete in a matching cabinet as either model 117-XC or 230-XC. However, in some cases an owner may have purchased a 117-X or 230-X basic supply only, perhaps in a D.C. supply combination, and he may wish later on to mount it in a matching cabinet. For this purpose the cabinet with speaker and cables is available separately. The basic A.C. supply mounts inside with three screws, and the pre-wired cable connects as shown in the schematic. Connections to the phone jack and speaker have already been made. Two leads from the indicator light must be run through grommet and soldered to the terminals provided at the bottom of the supply. Refer to the schematic for clarification. The A.C. line cord is also provided with the matching cabinet kit. These line cords are available separately also, and come normally wired and stamped for 117 volts. 230 volt line cords are also available on special order, or the 117 volt line cord may easily be wired for 230 volts by referring to the schematic. Note that the 230 volt line cord will work only with the 230-X basic A.C. supply. The 117 volt line cord will work with either the 117-X or 230-X.

ELECTRICAL DESIGN:

Both the A.C. and D.C. sections are conservatively designed for long, reliable service with a minimum failure rate. At the same time, they are designed for easy access and servicing for those times when it is required. Any component can be readily checked out and replaced in a matter of moments. The D.C. Converter and A.C. supply can be detached quickly from one another and tested individually, thus isolating the source of trouble.

The A.C. supply is quite conventional, using a silicon rectifier bridge for the medium voltage, and another for high voltage. The 117-X has a single primary winding for 117 volt input, while the 230-X has a pair of primary windings which connect in parallel for 117 volts, and in series for 230 volts. The switching is taken care of in the A.C. line cord plug.

MOBILE INSTALLATION
Model 14-117 or 14-230

12-13.5 volts D.C., Negative ground only. (For positive ground systems, the D.C. converter unit must be a model 14-CP , available from your dealer on special order.)

(A) Preliminary Steps. The D.C. electrical system in an automobile will sometimes generate high voltage transients. This can be caused by the starter motor, the alternator or generator, or loose wiring, and can represent a serious hazard to the transistors in your DC power supply. By selecting the best transistors available for the application, your Swan supply is capable of absorbing a good deal of abuse, but there is a limit to what even the best transistors can take and for this reason we strongly urge that you read the following notes completely, and follow them carefully. When this is done, you will find that your Swan power supply is extremely rugged and reliable. Field problems with the 14-117 supply are exceptionally low. But, first observe the following steps.

(1) Clean and tighten the battery terminals and clamps.

(2) Tighten battery cables where they attach to the starter solenoid and engine block.

(3) Inspect battery cables for corrosion or wear. Replace them if they look questionable.

(4) Check battery condition frequently. If the cells do not hold a similar charge or water level, replace the battery.

(5) Check alternator (or generator), and regulator connections for tightness. Also, primary ignition wiring, horn wiring, lights, etc.

(6) Measure the charging voltage from the alternator. Often the regulator is misadjusted, and the voltage setting may be excessive. It should not read more than 14.5 volts at normal engine speeds.

(B) Locate the power supply under the hood in a reasonably clear spot as close to the battery as is practical, and away from the engine. Particularly, keep it clear of the engine manifold, and away from the high tension ignition wiring. On many cars there will be a good spot at the front and to one side of the radiator. The power supply may mount in any position, and is quite well protected against normal splashing and dirt. The 117-X unit attaches to the car with three sheet metal screws. Remove the 117-X cover, and locate the three mounting holes. The 14-C Converter attaches to the 117-X with a machine screw.

In some cars it may be impossible to find room enough under the hood for the 14-117 assembly. If necessary, the 14-C and 117-X units can be separated 2 or 3 feet, and connected electrically with appropriate Jones plugs. 10 gauge wire is then required between terminals.

In other cases, it may be advantageous to install the 14-117 under the dash, or in the trunk of the car. Heavy battery leads with adequate automotive type insulation must be used. For trunk mounting, at least 6 gauge cables are recommended. In all installations the circuit breaker must be mounted close to the battery. Never run a long cable from the hot battery terminal to the power supply without a fuse or circuit breaker close to the battery. Failure to observe this rule will result in a serious fire hazard!

(C) Connect a cable from the hot battery terminal to the circuit breaker, keeping this cable as short and direct as possible. Then connect a cable from the circuit breaker to the +12 post on the 14-C Converter unit. Next, connect a cable from the negative post of the 14-C unit to the ground terminal of the battery. If possible, drill and tap a hole in the battery post for a contact stud. The more directly the cables are connected to the battery, the less chance there will be for voltage transients to reach the transistors.

(D) Run the 10 conductor power cable from the transceiver to the power supply and connect by color code as illustrated in the schematic diagram.

(E) There are two ways of wiring the relay circuit in the 14-C Converter. The simplest method is to connect a wire jumper from the relay terminal post to the +12 terminal on the 14-C . These posts are just an inch apart, and an 18 gauge bare jumper is sufficient. However, when connected this way, it will be possible for anyone to turn on the transceiver at any time, and for the transceiver to be accidentally left on, running the battery down.

The second wiring method provides for connection to the accessory circuits of the car, so that the ignition key is required in order to turn on the transceiver. To do this an 18 gauge insulated wire must be run from the 14-C relay terminal to the accessory circuit under the dash of the car. This wire may be run alongside the 10 conductor power cable which goes to the transceiver. The accessory circuit will be found on one terminal of the ignition switch. Your service garage can be helpful in locating this. Otherwise, it may be easier to locate the 12 volt input line to the car radio, and splice into this line. Since the 14-C

WARRANTY POLICY

SWAN ELECTRONICS CORPORATION WARRANTS THIS EQUIPMENT AGAINST DEFECTS IN MATERIAL OR WORKMANSHIP, EXCEPT FOR TUBES, TRANSISTORS, AND DIODES, UNDER NORMAL SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF ORIGINAL PURCHASE. TUBES, TRANSISTORS, AND DIODES ARE COVERED UNDER THE WARRANTY POLICY FOR A PERIOD OF 90 DAYS. THIS WARRANTY IS VALID ONLY IF THE ENCLOSED CARD IS PROPERLY FILLED IN AND MAILED TO THE FACTORY WITHIN TEN DAYS OF DATE OF PURCHASE. DO NOT SHIP TO THE FACTORY WITHOUT PRIOR AUTHORIZATION. THIS WARRANTY IS LIMITED TO REPAIRING OR REPLACING ONLY THE DEFECTIVE PARTS, AND IS NOT VALID IF THE EQUIPMENT HAS BEEN TAMPERED WITH, MISUSED OR DAMAGED.